The Reader Writes:—

Perkin's Mauve

Dr. August Merz, in his interesting article "The Sons of Aniline," in a recent issue of your journal, writes: "The aniline Perkin used in his early experiments, obtained from coal tar, was contaminated with toluidine. Had he used pure aniline his experiments could not have yielded his new dye."

At the time of the Jubilee of the coal tar colors I made this same remark in the pages of *The Dyer and Calico Printer* and my old friend and almost neighbor, Dr. Perkin, wrote to me at once in qualification:

"Your remarks about pure and impure aniline are true in reference to Rosaniline but *not to* Mauveine. The commercial coloring matter contained two mauve dyes, one produced from aniline alone, the other from aniline and toluidine. Perfectly pure aniline can be used to produce the mauve. The two products are closely allied. The one from aniline I have called Pseudo Mauveine, the other Mauveine."

Later, Dr. Perkin showed me samples and dyeings of both dyes. There was little difference.

In the same letter he corrected another frequent misstatement: "Hofmann did not suggest that I should work on quinine. It was my own idea and done in my private laboratory in my father's house."

When he retired Perkin converted his house into a series of laboratories and built a larger house by the side of it. He bought a large plot of land opposite the house, turned it into a garden and grew madder there every year, "lest the breed becomes extinct."

In his laboratory it appeared to me that the less commercial potentiality there was in a research, the better he was pleased. At the time of his death he had long been working on the influence of the magnetic field on polarization.

Harrow Weald, Middlesex, England — ARTHUR MORRIS, Editor of *The Dyer* from 1889 to 1929

"Why Chemists Get Hired"

The articles deal only with the college graduate. Apparently nobody else is ever thrown out on his ear. The college professors apologize for their products; one might almost accuse them of seeking alibis. Nobody tries to defend the poor graduate. Incidentally, all contributors are themselves degree holders. How did they escape?

What do your correspondents expect of the 22-year old just out of college?

Sound training in fundamental science (chemistry and physics, and perhaps also biology); training in foreign language, in mathematics, economics and accounting; in laboratory technique. He must be a logical thinker, have personality plus, ability to sell himself to the boss and his products to the consumer. Also must be modest, realize that he is no better than his fellows and not worth much of a salary. Above all he must know how to write a good report.

And there are only eight semesters between high school diploma and college sheepskin. One professorial solution is to make the 20-year old youngster work in a chemical plant all summer after he has worked all winter on a program that would make a union schedule look pretty soft.

Four years aren't long enough to get even the frequently mentioned, but never defined, "fundamentals," let alone details. The graduate cannot be a trained specialist; he can't be turned loose on his own any more than can anybody else of the same age. The colleges have already weeded out those obviously unfit mentally. It is up to industry to determine where the new man is most useful or whether he can be used at all. One suspects that often the real trouble is with the boss, who has failed to give proper directions and not with the young man, who has been abruptly transferred from college into strange surroundings.

A lot is said about personality. Is the graduate any cockier than the average young mechanic who knows that he is protected by union rules?

Chemistry is an involved subject; a man barely out of his teens has not had time to learn much about it. Smooth adjustment to business and social relations comes only after long experience. The college makes a start; our research laboratories fill their staffs with its graduates. The negative character of the contributions is regrettable; any young fellow after reading these letters must conclude that he is going into a hostile world where every hand is against him. Can't CHEMICAL INDUSTRIES run a series:—"Why Do All of Us Hire College Men?"

Washington, D. C. — M. H. HAERTEL

The Mother Tongue

Prof. Sweeney makes a good suggestion that the teaching of chemical engineering would be made both easier and better by sound monographs written by practical operating men. But what operating man so qualified has time or energy or inclination to do so? Furthermore, what company would permit any member of its staff to write a truly up-to-date working manual?

Because the little tricks of the operating trade are so valuable and hence so closely guarded, the colleges will have to trail along teaching semi-obsolete methods and practice. There's no cure for this that I can see, though your own editorial suggestion of "exchange professors" between industry and colleges might be worked out and would be a great help in giving both students and teachers a better contact with the grim realities of chemical manufacturing.

Boston — H. P. GRADY

The Pink Ruffles

Blame for the ruffles that bedeck the mental equipment of the younger generation of chemists and chemical engineers does belong to our universities and colleges. Admitted that many—possibly most—of our young men are infected with the idea that the world owes them a living, that the capitalistic system is all a howling failure, that every employer is a labor exploiter, that six months of any kind of sloppy work entitles them to a raise, and that six years service gives them a mortgage on their position for life, etc., etc., *ad nauseam*; nevertheless, it is a function of higher education to teach men to think rather than emote over even their own problems, and to give some fair idea of the course of human accomplishment, as well as a fair perspective on human affairs.

So long as our college faculties harbor a great crowd of half-baked introverts who have shunned the realities of life and of open competition for daily bread, and who propagate a wishy-washy communism, we shall continue to get just such half-baked notions fed to our young men. To paraphrase a famous saying: "Oh academic freedom, what crimes are committed in thy name!"

East Orange, N. J. — LEE H. SEATON

CHEMICAL INDUSTRIES

The Chemical Business Magazine

Which Way Recovery?

SINCE 1932 this country has depended upon the federal government to restore the normal, busy, prosperous state of American business. It is a novel experiment, but the experience of five years' trial ought to yield something tangible.

The basic philosophy of the plan was to check the deflation of values by raising prices and wages; to revive economic activity by generous government spending involving large purchases of materials and equipment; and upon the restoration of normal activity to pay the bill out of the taxes paid upon increased sales and larger incomes. This is a logical program. Though questioned by those who see in more goods at lower costs the real test of an abundant and safe economic system, nevertheless, the pump-priming philosophy offers a quicker, less painful solution.

To execute this plan the President prompted and Congress adopted bold, strong measures. The dollar was devalued, and vast sums were spent to support the unemployed, for a soldier's bonus, upon public works, and loaned to aid banks and railways, to home and farm mortgagees. Special efforts were made to assist the farmer by destroying surplus farm goods and curtailing farm output and also by taxing the whole people to pay direct subsidies to farmers. To aid the wage earner, after the N. R. A. effort proved abortive, attempts have been made to raise wages and shorten hours, through collective bargaining.

Stripped of detail and regarded objectively, this summarizes the New Deal recovery plan. Twice it has been endorsed by the American people at the polls. Though handicapped by extraneous and conflicting reform measures, it did move forward towards its objective till last October. Then it stopped short, suddenly and unexpectedly, and just when it should have reached its final triumphant stage with business itself taking up unemployment and paying the taxes that would liquidate the government's costs of restoring prosperity.

Here we stand today, bogged down at the further edge of the slough with firm, dry ground a few steps ahead.

The President is consistent in his continued effort to raise the price and wage level. The majority of economists and business men believe this philosophy to be fundamentally unsound; but they cannot expect Mr. Roosevelt to commit political hari-kari for an economic theory, and from the practical point of view also, the nation must salvage the enormous cash investment in pump-priming or we shall all be bankrupt in an obligatory inflation.

The President is too prejudiced against Business and Business is too distrustful of the President to make possible the sorely needed cooperation without the aid of a go-between. It is up to Congress, and when they reconvene this month, the Senators and Representatives have but one question to answer.

Why have the American people—financiers and farmers, factory owners and factory workers—failed to capitalize at this critical moment their vast investment in the New Deal recovery program? That answer applied honestly as the measure of the soundness of any legislation would "save the President's face," and "put Business to work." This combination would very quickly give us prosperity.

Williams Haynes, Publisher and Editor; A. M. Corbet, and W. J. Murphy, Associate Editors; W. F. George, Advertising Manager; D. O. Haynes, Subscription Manager; J. H. Burt, Production Manager.

A Lively Corpse Acetate of lime has been writing another interesting chapter in the history of "Synthetic vs. Natural." The rising importance of the synthetic acetic acid producer and the corresponding decline of the lime converter is well known, but events of the past few weeks have proven that while the latter may be down, he is not out. A month ago the industry was surprised that '38 acetic acid contracts did not contain the time honored acetate of lime clause, a declaration that synthetic interests no longer felt it necessary to base prices on the rise and fall of acetate of lime. Some even construed it as a sort of an obituary notice of one of our oldest divisions of the chemical industry. But a 30c decline in lime, from $1.95 per hundred pounds to $1.65, has brought acetic prices down to the base of the current acetate price. A number of acetic acid consumers, who have benefited this year because of lower acetate of lime prices do not take too kindly to its omission in 1938 contract conditions. Of course, if lime should rise during the first quarter, the consumer will be decidedly benefited by this omission. But, in or out of the written agreements, acetate of lime is still plainly able to control the price structure.

Another "First" Just what is the state of chemical business today? A guess will not do. Your own figures are only part of the story: they need a real yardstick for intelligent comparison. Carloadings, bank clearings, production of gasoline, shoes, glass, newsprint, etc., chemical employment and payrolls—all these, and many other vital statistics will be found much amplified and in a new form in the blue page Section Two of this issue.

This picture of current chemical business will appear here, always in the same comparable form, every month, and with it one sheet (2 pages) on the chemical financial situation and also all the chemical patents—the quickest and only complete digest of U. S. patents published.

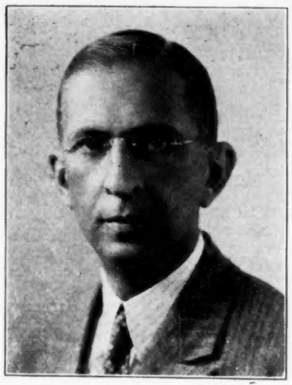
Stale statistics are only dull history: to be valuable they must be promptly available, so in this new "Statistical and Technical Data Section," we shall print the live official, complete chemical figures just as soon as they are available. This month we give you the final statistics on alcohol, naval stores, and world nitrogen production.

This current, complete service on statistical data in a form highly available for reference and comparison is a long step forward from the old fashioned review number which all too often is but a publisher's excuse to sell extra advertising in a special issue. Official figures of practical value today are at best none-too-quickly released, and like ether in a water bath, their usefulness evaporates rapidly. That usefulness is much enlarged if comparable figures are presented that clarify trends, and if the whole data may be made easily available for future reference. Our new "Statistical and Technical Data Section," by handling this material as news and by presenting it in a form most handy for comparison and for permanent information, perfectly meets modern needs.

Thus another important "first" is added to CHEMICAL INDUSTRIES' record of real innovations in chemical publishing. We are proud of that record. It is evidence of initiative in service to our readers, and we have been greatly flattered that so many of the ideas we originated have won the seal of approval of other publications in the chemical field. Like the straight alphabetical arrangement of chemical prices, with containers and quantities a part of every quotation; like chemical stock prices, a picture section, and a Buying Guide that lists all suppliers; like personal reports of plant visits and the adaptation of the popular "double issue" feature; this separate section of facts and figures published currently in this convenient form is original with us. It is, we feel, a truly notable "first" in editorial leadership.

Birthday Greetings Notable chemical anniversaries will be celebrated during 1938. W. H. & F. Jordan of Philadelphia reach the venerable age of 165 years and it is 145 years since John Harrison made the first sulfuric acid in America. Eaton-Clark & Co., Detroit chemical merchants, are celebrating the one-hundredth anniversary of their establishment by the direct ancestors of the present firm's active heads. The Mathieson Alkali Works and Martin Dennis Company are both forty-five years old; the American Cyanamid, thirty. Diamond Alkali, Atlas Powder, Hercules, the American Agricultural Chemical Co., all pass the quarter century mark. Joseph Turner & Co. and Tennessee Eastman are now fifteen years old, and the Potash Company of America, a lusty stripling of five.

The National Academy of Sciences attains the ripe age of seventy-five. The American Leather Chemists Association celebrates its thirty-fifth anniversary; the American Institute of Chemical Engineers, its thirtieth, and Mellon Institute, its twenty-fifth. Echoes of the war, the Chemical Foundation, and the C.W.S. branch of the Army are twenty years old. And T.V.A., believe it or not, is "five years agrowing come Michaelmas."



Industry Plans for Prosperity

By Lammot du Pont

No factory is built, no new chemical developed, no retail purchase made without business planning, but no business planning can be anything save a mockery if laws and labor and taxes and value of money are not reasonably stable. The president of the du Pont Company points this out forcefully in this paper abstracted from his address at the National Association of Manufacturers.

AMID the confusion and controversy that mark the economic thinking of today, we stand in remarkable agreement on one point. American opinion seems unanimous that the chief hope for a lasting solution of our major social difficulties lies in the vigorous expansion of industry into new fields.

All sides are looking to industry and to industrial science to create millions of new jobs and end unemployment for all who can and will work.

Granting that the purchasing power of a part of our population is too low, it is industry alone that can produce the additional national income necessary to a measurable improvement of this condition.

Some parts of our agriculture are disorganized. In the past, technological progress originating in and made available by industry has been the recourse of the American farmer in similar emergencies; so that here, too, industry and science are being hailed as agriculture's greatest hope.

Poverty, unemployment and disease are no longer accepted by us as unavoidable world-old hazards of man's existence on earth. As a people, we recognize a responsibility for their progressive reduction and, if possible, their eventual removal, an end once thought to be unattainable. Let us remember that industry inspired this viewpoint by virtue of solid accomplishment that has raised us, nationally, to a plane from which, for the first time in history, we can see over the walls of precedent.

In this, the world's most intensely industrialized nation, poverty and want, real though they are, have become lesser problems than in any comparable community, regardless of its form of government, its political leadership or its economic pattern. We have in the United States less than seven per cent. of the world's population and less than six per cent. of the world's land, and yet the annual domestic business done by, between and among Americans represents almost 40 per cent. of the world's trade.

It is not surprising, therefore, in this industrial age, in this industrially built nation, that the bulk of responsibility for future social betterment should be placed on industry's shoulders. It belongs there. And industry accepts that responsibility. Even more, we welcome this responsibility with full confidence in our own and our Nation's capacity to discharge it successfully. All that we ask is the same fair opportunity to work that we believe should be given to the humblest citizen.

The difficulties confronting us are not of recent origin. Their roots sink through all the levels of civilization to the very beginning. It follows that they cannot suddenly be removed. New jobs, new wealth, farm prosperity cannot be picked like dreams and theories out of the air. They can be produced only through planned research, planned development, and by planned expansion of plant, sales, adminstrative and other facilities, which means at every step the planned expenditure of capital months and years in advance of one penny of return. And this must be intelligent planning.

In my own company certain projects only now coming to fruition had their genesis as far back as eight or ten years ago. A new type of motor truck tire recently placed on the market was under test for three years before the tire manufacturers were satisfied its production was warranted, and prior to that research chemists worked even longer on the basic development that made the tire possible. So-called new industries such as air conditioning, rayon, plastics, radio were twenty or more years in developing their present momentum. These instances are typical.

All forward-looking industrial activity is planned. It is based on what the planners believe will be the needs and conditions of one, five, ten or even twenty years hence. Before a new factory is built or an old one is enlarged, before a pound of raw materials is ordered or a dollar is appropriated for wages, advertising and other expenses, industry must know with some reasonable degree of certainty the conditions that will prevail once the wheels begin turning. Even the smallest retail merchant, who buys in February for delivery in November, faces this identical problem of trying to gauge the future. He is bold or cautious according to the range and clarity of his vision. So is all business.

Obviously, then, when the future is uncertain, business is uncertain. It becomes like an automobile driver who, blinded by fog, feels his way over a strange road fearful of the ditch. The power and speed built into the car are useless. There is no fair opportunity to employ them except at the risk of a wreck. Con-

sequently the sensible driver slows down or pulls off to the side until the fog lifts.

Today, industry is blanketed by just such a fog of uncertainty.

Uncertainty rules the tax situation, the labor situation, the monetary situation, and practically every legal condition under which industry must operate. Are taxes to go higher, lower, or stay where they are? We don't know. Is labor to be union or non-union, is the A. F. of L. or the C. I. O. to dominate it, and in any event what will be expected of the employer? It is impossible even to guess at the answers. Are we to have inflation or deflation, more government spending or less? Industry is without a scrap of knowledge on either subject. Are new restrictions to be placed on capital, new limits on profits? Industry doesn't know. The whole future is a gigantic question mark.

I say this in criticism of nobody. Perhaps the uncertainties of the recent past, which were, in part at least, the outgrowth of world conditions beyond any one nation's control, justify and excuse the uncertainties of the present. That is for history to decide. What has been done, wisely or unwisely, is behind us. Let us leave it there. It is no time for post mortems.

My own thought may be summed up in a sentence: Give industry a reasonable degree of certainty upon which it can count in planning current and future operations. In short, lift the fog and let us see the road we must travel.

At this juncture, the stabilization of tax rates over a definite period, plus a simplification of the tax structure, may be almost more important than the actual level of taxes. Simplification of the tax structure would, indeed, amount to a tax reduction, because it would decrease the high and ever rising cost the taxpayer must bear to determine what taxes he owes. The present fear that we face a rapidly ascending tax scale, as well as new taxes, the nature of which nobody can guess, stands like a wall in the path of industrial expansion.

The labor situation should be stabilized. Strikes, broken contracts, wars within labor's own ranks, the constant threat of sweeping new laws, have reduced industrial planning to the category of a gamble, so far as the labor factor is concerned. Employer, labor and public alike are suffering in consequence. Unemployment is increasing. New plants that were planned have not been built. They dare not be built in face of the uncertainty. Here again is a situation wherein the stabilization of fair conditions over a definite period may be more important even than the details of wage rates and hours or the precise form of labor organization.

If industry is to have a fair opportunity to work, the legal rules under which it must operate should be stabilized immediately. As long as the law-making mills grind, the fog of uncertainty mocks the industrial planner. Business needs more than a mere breathing spell from legislative experimentation. It needs positive, reliable assurance that the complicated terms and conditions under which it must function are finally determined, subject only to an unmistakable public demand for their amendment. As it is, the business man is the subject of more legislative concern than the criminal. The latter enjoys far less uncertainty of the laws prescribing his operations. The criminal laws are stabilized.

Few people realize the cost of putting one man to work. A recent study of more than 100 factories employing 112,000 men and women showed a compound average investment per employee in excess of $8,000, of which almost $3,000 represented working capital. On the basis of these figures, which undoubtedly are low for industry as a whole, the task of providing the facilities and working capital necessary to give jobs to the existing labor surplus in this country is one that pre-imposes an investment by private industry that would be no less than twenty-five billions of dollars, and which might greatly exceed that sum. That is to say, it will take twenty-five billion dollars, or more, invested a year, two years, perhaps even ten years in advance of any hope of return on it, to create 3,000-000 industrial jobs that do not now exist. If anything, this is an under statement of the problem.

Such an expansion of the present employing structure can only be achieved by the discovery, development and popularization of new products, by vastly broadening the market for existing products through lowering their cost, and by maintaining a rule of fair return for all effort, not excepting capital effort.

In recent years, more than 10,000 new metal alloys and more than 250,000 new compounds of chemicals have been produced. Of these, only a handful as yet are in use or their possibilities realized. What they hold in the way of new materials for industry, new drugs for medicine, new products for new industries and new jobs, is a guess beyond the most fertile imagination.

Once dependent wholly on natural materials, only man's own ingenuity is now the limiting factor in industry. From an industrial era of adaptation, we have entered a new era of creation. The next ten years should outstrip the previous twenty, the next twenty the previous fifty, if the opportunity for accomplishment remains at all comparable. America's industry asks only that fair opportunity.

Possible New Source of Potash

In a recent report, published by the United States Bureau of Mines, entitled "Recovery of Potash from Tailings of a Porphyry Copper Property," the possibilities of a new source of potash fertilizers are considered. According to the authors, the tailings of porphyry copper contains 5 to 10 per cent. K_2O and through treatment can be made to produce a valuable addition to the sources of this fertilizer material.

CHROMITE

as a Chemical Raw Material

By Robert H. Ridgway

Mineral Economist, Metal Economics Division, U. S. Bureau of Mines

CHROMITE has been produced commercially for slightly more than a century. Developed, originally, chiefly as a chemical pigment raw material, it has subsequently found extensive application in other chemical industries, as a refractory material for furnace linings and as the sole source of the metal chromium for the metallurgical industry. For several decades afterwards it was used exclusively in the chemical industry, first as a pigment raw material and later in the manufacture of compounds for tanning skins. Its use as a refractory material followed and for several years prior to 1914 predominated. Post-war development in alloy steels, principally stainless, enhanced the metallurgical demand which now accounts for most of the domestic consumption. While chromite now has many useful applications in the chemical industry, by far the greatest consumption is in the metallurgical and refractory fields. In fact, strictly chemical uses rank a poor third; the distribution of domestic consumption has been estimated** as follows:

Metallurgical	50 per cent.
Refractory	40 per cent.
Chemical	10 per cent.

The only commercial source of chromium for industry is the mineral chromite, which, when pure, consists of ferrous and chromic oxides chemically united in about equal molecular proportions ($Cr_2O_3.FeO$). However, except in meteorites, pure chromite, which would contain 68 per cent. Cr_2O_3, is not known to exist in nature, the components being replaced chiefly by alumina (Al_2O_3), ferric oxide (Fe_2O_3), magnesia (MgO), lime (CaO), and silica (SiO_2), with the result that commercial grades vary in Cr_2O_3 content from 30 to 56 per cent. Often the replacements are of such nature and extent that the material is of no value.

Chromite is black to brownish-black in color, has a brown streak, is translucent to opaque, and has a sub-metallic luster. Its hardness is 5.5; it is brittle and has an uneven fracture. Specific gravity is 4.32 to 4.57, and the mineral is sometimes feebly magnetic. The crystallization is isometric, but crystals are small and rare. It is infusible and gives a definitely green borax bead test in both the oxidizing and reducing flames.

Chromite is found invariably associated with ultra-basic igneous rocks or their metamorphic equivalents, such as serpentine, the most common gangue rock. Its origin is generally attributed to magmatic segregation, although research [7, 15, 17, 18] in recent years indicates that some chromite may have been introduced after solidification of the rock magma or during its later stages. It occurs disseminated or in compact masses, lenses, kidneys, or stringers. In South Africa some deposits occur in bedlike seams conforming to the pseudo-stratification of the rocks.[22] The seams are elongated lenses and may extend up to 1,000 yards. Often the individual ore bodies are relatively small, which adds to mining and exploration costs, but extensive reserves are known to exist in various countries. As chromite alters very slowly, it may collect in gravel deposits or placers, but only a few deposits of this nature have had commercial importance.

Chromite is extracted from the earth both through open-cut and underground mining operations, depending on the nature of the deposit being exploited. Most of the ore, however, is taken from open pits. A large part of the chromite is shipped as mined; often hand-sorting is practiced, and in some districts the ore is concentrated. Concentration mills are in use in Canada, New Caledonia, Turkey, and Yugoslavia.

The first mining of chromite is said to have taken place at the Roros deposit in Norway as early as 1820, but the first well established output came from the Reed Mine in Maryland about 1827.[21] The United States was the principal source until 1860, when Turkey took the lead. Russia, in turn, became the chief producer from 1897 to 1902, and from 1903 to 1909 New Caledonia held first place but alternated with Southern Rhodesia from 1910 to 1917. In 1918, 1919, and 1920-21 the United States, India, and New Caledonia led, respectively. In 1922 Southern Rhodesia assumed first place, which it held during the period of expanding demand of the twenties. Thus, the world sources of chromite have moved from locality to locality, usually having followed the discovery of newer deposits or the depletion of old deposits.[13] War and civil disturbances also have affected the supplies moving to world markets. The trend of world production during the present century is shown in the following table. Reflecting principally the increased demand from the refractory and metallurgical industries, production has risen from 62,000 long tons in 1901 to 781,000 tons in 1935, and

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the trend is still upward, the output in 1936 undoubtedly exceeding the record output of the preceding year.

Table 1

World production of chromite, 1901-1935, in thousands of long tons

Year	Quantity	Year	Quantity
1901	62	1919	143
1902	62	1920	231
1903	61	1921	127
1904	101	1922	141
1905	106	1923	196
1906	126	1924	282
1907	138	1925	303
1908	115	1926	359
1909	124	1927	403
1910	119	1928	450
1911	126	1929	625
1912	165	1930	551
1913	174	1931	407
1914	186	1932	294
1915	158	1933	403
1916	263	1934	607
1917	246	1935	781
1918	325		

The chief sources during the last decade have been Cuba, Greece, India, New Caledonia, Southern Rhodesia, Turkey, U. S. S. R., Union of South Africa, and Yugoslavia. Recent developments in the Philippine Islands indicate a potential production of some magnitude. Throughout the 1920's, Southern Rhodesia was the largest single source, contributing 43 per cent. of the total. During this period of great expansion in world production and trade, Cuba, Greece, U. S. S. R., and Yugoslavia increased their outputs and became important sources of supply. It was at this time that the Union of South Africa came into the picture as a significant factor, and by 1929 it was the second largest producer of chromite. During the depression period the Southern Rhodesia output shrank from 42 per cent. of the world total in 1929 to 9 per cent. in 1933, while Turkey increased its production fourfold from 30,000 tons in 1930 to 120,000 tons in 1934. The U. S. S. R. appeared to be the largest producer in 1935, with Turkey a close second. The tonnage figures, however, are not strictly comparable because the bulk of Russian output is of lower-grade ore, while that produced in Turkey is high grade.

With the exception of the U. S. S. R., chromite is not produced to any great extent in countries in which it is consumed. The chief consumers are the highly industrialized nations, whereas chromite is produced mainly in outlying areas not yet well developed. It follows that exports of the principal producing nations tend closely to reflect production trends as well as to show whence consuming nations get their supplies. Figures for the decade ended in 1935 are shown in table 3.

The flow of chromite to world markets during 1934 is shown in Fig. 1, on page 22.

The United States, the principal consuming nation, is no exception to the above statement, and for this reason chromite is on the list of strategic commodities.

Table 2

World production of chromite, 1920-1935, in thousands of long tons

Country	1920		1921		1922		1923		1924		1925		1926		1927	
	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent
Cuba	2/		2/		---	--	10	5	19	7	30	10	36	10	17	4
Greece	12	5	8	6	9	6	14	7	14	5	8	3	20	6	17	4
India	26	11	34	27	22	16	53	27	45	16	37	12	33	9	57	15
New Caledonia	89	39	29	23	19	14	23	12	22	8	34	11	34	9	42	10
So. Rhodesia	53	24	44	35	82	58	85	43	152	54	121	40	162	46	195	49
Turkey	24	10	1/		2	1	1/		3	1	7	2	6	2	18	4
U.S.S.R.	3	1	4	3	2/		2/		12	4	30	10	30	8	19	5
U.S. Africa	---	--	1	--	---	--	---	--	4	1	14	5	12	3	17	4
Yugoslavia	2/		2/		2/		2/		2/		12	4	16	4	9	2
Miscellaneous	24	10	7	6	7	5	11	6	11	4	10	3	10	3	12	3
	231	100	127	100	141	100	196	100	282	100	303	100	359	100	403	100

Country	1928		1929		1930		1931		1932		1933		1934		1935	
	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent
Cuba	34	8	53	9	41	8	15	4	---	--	24	6	49	8	48	6
Greece	21	5	24	4	23	4	6	1	2	--	15	4	30	5	31	4
India	45	10	50	8	51	9	20	5	18	6	16	4	22	4	39	5
New Caledonia	56	12	52	8	61	11	73	18	68	23	49	12	54	9	54	7
So. Rhodesia	196	43	262	42	202	37	80	20	15	5	34	9	71	11	104	13
Turkey	12	3	16	2	29	5	54	13	54	19	74	18	118	19	148	19
U.S.S.R.	29	6	52	8	66	12	66	16	65	22	108	27	125	21	175	23
U.S. Africa	31	7	63	10	13	2	23	6	19	7	33	8	60	10	89	11
Yugoslavia	16	4	42	7	51	9	57	14	38	13	26	6	47	8	52	7
Miscellaneous	10	2	11	2	14	3	13	3	15	5	24	6	31	5	41	5
	450	100	625	100	551	100	407	100	294	100	403	100	607	100	781	100

1/ Data not available
2/ Less than 1000 tons, included under Miscellaneous.

The subject has been given considerable study by the governmental departments concerned, and in 1934 the National Resources Board[11] suggested acquiring a stock pile containing 300,000 tons of chromite ore containing 50 per cent. Cr_2O_3, an estimated war supply for two years. This stock-pile reserve would be held inviolate until actually required for war needs and would be supplemented by domestic production and such imports as would be available.

Table 3

World exports of chromite, 1926-1935, in thousands of long tons

Country	1926 Quantity	1926 Per cent.	1927 Quantity	1927 Per cent.	1928 Quantity	1928 Per cent.	1929 Quantity	1929 Per cent.	1930 Quantity	1930 Per cent.
Cuba	36	13	17	6	34	9	53	10	41	10
Greece	19	7	16	5	17	5	20	4	24	6
India	40	14	43	14	45	13	32	7	30	7
New Caledonia	23	8	42	14	56	16	58	12	53	13
So. Rhodesia	155	54	161	52	162	45	251	50	172	41
Turkey	...	..	...	..	12	3	15	3	28	7
U. S. S. R.	...	..	2	..	3	1	9	2	15	3
U. S. Africa[1]	13	4	18	6	23	6	44	8	23	5
Yugoslavia	...	..	10	3	9	2	21	4	32	8
	286	100	309	100	361	100	503	100	418	100

Country	1931 Quantity	1931 Per cent.	1932 Quantity	1932 Per cent.	1933 Quantity	1933 Per cent.	1934 Quantity	1934 Per cent.	1935 Quantity	1935 Per cent.
Cuba	15	6	...	..	24	8	49	11	48	9
Greece	1	..	1	..	13	5	22	5	31	6
India	13	5	26	12	17	6	31	7	41	8
New Caledonia	38	15	14	7	24	9	37	8	73	13
So. Rhodesia	87	35	35	17	32	11	65	15	105	19
Turkey	25	10	54	26	87	31	128	29	150	28
U. S. S. R.	23	9	41	19	40	14	36	8	11	2
U. S. Africa[1]	20	8	20	10	26	9	46	11	59	11
Yugoslavia	29	12	20	9	19	7	27	6	22	4
	251	100	211	100	282	100	441	100	540	100

[1] Includes pyrites.

U. S. Production Small

Only a small amount of chromite is produced in the United States; virtually all of the demand is met by imports.[14] Domestic chromite deposits, however, are known to exist principally in California, Oregon, and Montana, and during the world war, when shipments from abroad were difficult to obtain, numerous small operations in the first two States supplied important quantities.[4] Such production, however, was stimulated by high prices, and with the return of more normal conditions domestic production declined and has since been unimportant. The small production in recent years has come from California and Oregon. In general, the extent and remote location of deposits, together with the grade of ore, have precluded development of domestic output. During the last year there has been considerable activity in chromite exploration in the Western States and production may be increased in coming years. It appears likely, however, that this output will be consumed principally in the metallurgical industry.

Virtually all of the chromite necessary for American industry since the war has been supplied by foreign nations. The United States is still the largest single consuming factor. The increased takings by European nations during the past few years undoubtedly reflect the stocking of this strategic commodity for emergency and the intensive armament activities by the great military powers.

South Africa Largest Source of Supply

As shown in table 5, next page, the largest source of our supply has been Southern Africa, comprising ore from Southern Rhodesia and the Union of South Africa. The records of the Bureau of Foreign and Domestic Commerce credit the bulk of this movement from Mozambique. Actually, there is no production in Mozambique, but the ore from Southern Rhodesia moves through the port of Beira and that from the Union of South Africa is shipped from Lourenco Marquez, both in Mozambique. Data compiled from the United States Shipping Board, while on a fiscal year basis, shed some light on the quantity coming from these two countries. The ores from these two sources are somewhat dissimilar and enter different consumption fields. Typically, the Union ores are relatively low in Cr_2O_3, with a high iron content and consequently are not used in the metallurgical industry but find outlets in the chemical and refractory fields. Much of the Rhodesian ore is used in the manufacture of ferrochromium, but significant quantities are used in chemicals and refractories.

Table 4

Chromite mined and shipped in the United States, 1914-1936.

Year	Production, long tons	Shipments, long tons	Producing States
1914	[1]	591	
1915	[1]	3,281	
1916	[1]	47,035	
1917	[1]	43,725	
1918	[1]	82,430	
1919	[1]	5,079	
1920	3,102	2,502	Calif., Ore.
1921	250	282	Calif., Ore.
1922	420	355	Calif., Md., Ore.
1923	572	227	Ore., Md., Calif.
1924	233	288	Calif., Mont.
1925	157	108	Calif., Ore., Md.
1926	194	141	Calif., Md.
1927	50	201	Calif.
1928	368	660	Calif., Mont., Md.
1929	543	269	Calif.
1930	310	80	Calif.
1931	762	268	Calif.
1932	200	155	Calif.
1933	966	843	Calif.
1934	341	369	Calif.
1935	440	515	Calif.
1936	269	269	Calif., Ore.

[1] Not available.

Table 5

Imports of chromite into the United States, 1926-1936, by countries, in long tons

Country	1926	1927	1928	1929	1930
Cuba	36,020	16,983	33,707	52,949	40,982
Greece	21,065	22,527	17,152	26,647	49,736
India	13,800	13,572	17,591	21,033	14,542
New Caledonia	11,146	11,500	15,154	26,846	31,022
British Africa	122,816	135,786	127,818	184,926	170,085
Turkey	.....	.....	200	1,700	2,591
U. S. S. R.	.....	.....	.....	.....	13,878
Yugoslavia	.....	.....	.....	.....	.....
Other countries	10,617	21,992	4,970	3,529	9,782
	215,464	222,360	216,592	317,630	330,531

Country	1931	1932	1933	1934	1935	1936
Cuba	14,957	.....	23,772	49,370	47,743	69,963
Greece	28,893	16,395	11,499	23,301	20,692	26,688
India	8,664	7,857	4,152	400	14,926	14,795
New Caledonia	39,579	11,550	15,150	19,530	55,686	65,450
British Africa	73,670	15,496	13,186	48,848	92,682	120,011
Turkey	2,198	17,602	27,854	28,730	16,060	19,490
U. S. S. R.	17,736	4,800	13,261	19,937	3,412	2,310
Yugoslavia	.....	.....	5,527	.....	.....	524
Other countries	26,831	15,443	2,110	2,181	7,862	5,027
	212,528	89,143	116,511	192,297	259,063	324,258

The following table shows the distribution of imports into the United States from Mozambique.

Table 6

United States imports of chromite from Beira and Lourenco Marques, Mozambique, for fiscal years 1926-1935, in long tons

Year ended June 30	Beira (Rhodesian ore)	Lourenco Marques (Union ore)	Total
1926	88,403	5,873	94,276
1927	176,173	6,258	182,431
1928	107,975	9,571	117,546
1929	137,562	10,638	148,200
1930	213,997	12,160	226,157
1931	106,717	2,660	109,377
1932	54,068	1,611	55,679
1933	4,000	996	4,996
1934	18,549	12,521	31,070
1935	40,500	13,107	53,607

Cuba, the closest source of our imported ores, supplies large quantities of chromite, but because it is low in Cr_2O_3 (32-33 per cent.) the use of this ore is limited to the refractory industry, as is a large part of the Greek ore. Indian ores are used chiefly in the metallurgical industry and in refractories. New Caledonian ores are preferred by the chemical trade and command a premium price but are also used in the metallurgical industry. Turkey supplies high grade, which is used in all three outlets. Imports from the U. S. S. R. have dropped off in recent years, due principally to increased demand within its own borders.

Uses of Chromium Compounds

While the bulk of the domestic consumption is in metallurgical and refractory fields, that moving into the chemical outlets is of such a nature that it must not be overlooked or even taken lightly. To the layman, the importance of chrome chemicals is not understood and, consequently, not appreciated. They enter into the fabrication of a vast number of articles that are merely taken for granted in the present setup. The silvery-white metallic trim on his automobile, furniture, plumbing fixtures, and other objects catch the layman's eye and he is told that it is "chrome," but many other articles, infinitely more necessary, are dependent upon compounds of chromium for their economic manufacture, and of this he is not aware. The following list of uses and industries employing chromium compounds, while not complete, indicates the wide application of chromium chemicals in industry.

Antiseptic	Electric cells	Paints
Adhesive	Engraving	Porcelain
Alizarin	Fireworks	Photographic reagents
Astringent	Fly paper (poison)	Pyrotechnics
Analytical reagent	Gas analysis	Pharmaceuticals
Brass pickling	Glass	Perfumery
Bleaching	Glue	Petroleum refining
Catalyst	Glazes, ceramic	Pottery
Chemicals, organic	Inks	Preservative
Chemicals, inorganic	Linoleum	Precious-metal refining
Chemical reagents	Mordant	Rubber
Ceramics	Medicine	Stone hardening
Calico printing	Matches	Tannage
Coal-tar products	Nitroglycerine explosives	Target signals
Discharge reagents	Oxidizing agent	Varnish
Dyes	Oilcloth	Waterproofing
Electroplating	Pigments	Woodstain

Chromite is the basic raw material used in making all chrome compounds, and virtually all of the ore entering the chemical industry is employed in the manufacture of sodium chromate and bichromate, which are used as such or constitute the material from which almost all other chromium compounds are made. In manufacturing sodium bichromate, finely pulverized chromate is intimately mixed with soda ash and ground burnt lime and roasted in an oxidizing atmosphere in a reverberatory or rotary furnace at about 900° C., where, according to the equation ($4\ FeO.Cr_2O_3) + 8Na_2CO_3 + 7O_2 = 2Fe_2O_3 + 8Na_2CrO_4 + 8CO_2$) the Cr_2O_3 is oxidized to sodium chromate. The function of the lime is mainly to keep the roast porous and to create sufficient surface to allow access for the reaction gases. The roast is stirred frequently until sintering takes place and the chemical reaction between the alkali and chromic oxide content of the ore has been completed. The sintered mass is then cooled and sodium chromate is extracted by leaching with water. This alkaline solution is then purified and treated with sulfuric acid to form sodium bichromate. After removal of the sodium sulfate by concentration, the hot sodium bichromate is cooled while being agitated to precipitate out the bichromate crystals, which are then separated from the mother liquor in hydro-extractors and dried in rotary driers. The product is packed in suitable containers ready for shipment. Concentrated liquor is also shipped or stored.

The domestic production of sodium chromate and bichromate as given by the Bureau of the Census from 1921 to 1935 has been as follows:

Table 7
Production of sodium bichromate and chromate in the United States, 1921-1935

Year	Production Short tons	Value	Establishments No.	Location
1921	18,169	$3,823,465	9	R.I. 1, N.Y. 3, N.J. 4, Md. 1
1923	26,879	3,994,566	5	N.J. 3, Md. 1, N.Y. 1
1925	27,820	3,526,568	5	N.J. 3, Md. 1, Mo. 1
1927	31,462	3,780,435	5	N.J. 3, Md. 1, Mo. 1
1929	39,301	5,137,346	8	N.J. 5, Md. 1, Mo. 1, Pa. 1
1931	24,745	3,162,000	7	N.J. 4, Md. 1, Mo. 1, Ohio 1
1933	29,234	3,281,000	6	N.J. 3, Md. 1, Mo. 1, Ohio 1
1935	42,325	4,762,728	6	N.J. 3, Md. 1, Mo. 1, Ohio 1

The principal producing plants are located as follows:

Mutual Chemical Co., Jersey City, N. J., and Baltimore, Md.
Natural Products Refining Co., Jersey City, N. J.
Standard Chromate Co., Painesville, Ohio
Martin Dennis, Newark, N. J.

Aside from its extensive use in the tanning of leather, sodium bichromate is the raw material for the manufacture of chrome colors (chrome yellows, greens, zinc chromate, barium chromate, lead chromate, and zinc green, etc.). Bichromate is also used in chrome dyes, mordants, intermediates, and to improve the fastness of colors in textiles as well as in the making of chromic acid, which is used in the electroplating industry. Chromium sulfate, chloride, alum, acetate, formate, bisulfite, fluoride, and hydroxide are also derived from the bichromate of soda. The bichromates are powerful oxidizing agents and this property is utilized in the production of photographic, pharmaceutical, and other chemicals, both organic and inorganic. Potassium bichromate is also used in industry and was formerly made by roasting chromite with potassium carbonate and lime, but it is now much more economical to make sodium bichromate first and convert this to potassium chromate by the use of potassium chloride. The chromates are used largely in the manufacture of other chemicals, in dyeing, and in treating boiler feed water for the prevention of scale.

A good grade of chromite is required by the chemical industry. Ores containing less than 45 per cent. Cr_2O_3 are not desired, as the use of lower-grade material increases the bulk of the ore handled, lowers furnace efficiencies, and increases the loss of other chemical reagents due to combination with impurities. High iron contents within reasonable limits are not objectionable and the ore should decompose easily. Silica should not exceed 8 per cent., and the ore should be low in sulfur and easily crushed. Chromite concentrates are acceptable in the chemical industry. New Caledonian ore is preferred and commands a premium price. The following table shows some typical chromites used in the chemical industry in this country.

Types of Chromite Used in Chemical Industry

Origin	Physical condition	Analysis (per cent.) Cr_2O_3	SiO_2	Fe
New Caledonia ...	Soft and friable	56	3	12
Southern Rhodesia.	Soft and friable	49	5	13
Transvaal	Soft and friable	45	3	18–19
Turkey	Concentrates	51	4	11

Inasmuch as the larger part of the consumption of chromite is in the metallurgical and refractory fields, typical analyses of chromite used in these industries follow:

Types of Chromite Used in the Metallurgical Industry

Origin	Physical condition	Analysis (per cent.) Cr_2O_3	SiO_2	Fe
Rhodesia (Selukwe)	Hard and lumpy	51	5 and under	11
Rhodesia	Friable, soft, easily broken	49.5	do.	14
Baluchistan	Hard and lumpy	51	do.	11
Yugoslavia	Hard and lumpy	51	6.50	12
Turkey	Hard and lumpy	49	6.50	12
India	Hard and lumpy	47	7	14
Philippines	Lumpy, very friable	53	3.5	11.7
India (Baluchistan) .	Lumpy, soft, weathers	53.5	2.3	11.2

Types of Chromite Used in the Refractory Industry

Origin	Physical condition	Analysis (per cent.) Cr_2O_3	SiO_2	Fe
Rhodesia	Hard and lumpy	45.5	8.1	10.5
Greece	Hard and lumpy	38.5	under 5	11
Turkey	Hard and lumpy	49	6	10.5
India	Hard and lumpy	47	7.5	13
Philippines	Friable	42	4	11
Cuba	Very friable	33	5	10.2

The domestic markets for chemical-grade chromite are the plants of the chemical manufacturers in New Jersey, Maryland, and Ohio. As the consuming plants are few and the sources of raw material are limited,

Table 8
Production of chrome pigments and chromic acid in the United States, 1921-1935

Year	Chrome yellow Pounds	Chrome yellow Value	Chrome green Pounds	Chrome green Value	Chrome orange Pounds	Chrome orange Value	Chromic acid Pounds	Chromic acid Value
1921	5,460,723	$1,087,815	7,968,498	$1,491,311	[1]	[1]	[3]	[3]
1923	13,238,317	2,379,338	13,078,252	2,291,753	[1]	[1]	[3]	[3]
1925	14,231,374	2,414,938	12,610,178	2,231,168	1,844,541	$340,047	[3]	[3]
1927	14,334,423	2,351,111	14,114,248	2,460,276	4,652,209	751,468	898,093	$241,965
1929	16,399,268	2,392,790	16,351,788	2,603,225	9,954,493	1,449,629	4,211,605	710,272
1931	13,345,746	2,019,456	17,083,866	2,564,497	8,321,990	1,265,922	3,024,854	423,069
1933	[1]	[1]	37,400,000	5,732,000	[1]	[1]	4,969,000	537,000
1935	39,170,554	3,396,268	15,593,977	2,109,742	[2]	[2]	6,723,304	887,842

[1] Included under chrome green.
[2] Included under chrome yellow.
[3] Not available.

Table 9

Imports of chromite into the United States 1926-1935, by customs districts, in long tons

District	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
New York	33,006	54,536	64,937	119,869	123,469	113,253	29,834	21,581	33,626	85,198	45,214
Philadelphia ...	118,048	112,825	49,314	96,094	89,509	33,818	18,326	41,427	83,781	87,202	116,250
Maryland	63,464	54,598	70,941	85,067	84,363	39,661	21,837	48,338	71,410	75,099	134,066
Virginia	.....	.....	30,900	16,600	32,175	25,486	18,636	4,616	2,541	8,400	25,475
Other districts..	946	401	500	.....	1,015	310	510	549	939	3,164	3,253
	215,464	222,360	216,592	317,630	330,531	212,528	89,143	116,511	192,297	259,063	324,258

the purchasing of chromite supplies is usually a matter of long-term contract between the parties concerned. The prices quoted in the domestic trade journals are for foreign ores and are given in dollars per long ton c.i.f. North Atlantic ports. The quoted price of chromite containing 48 per cent. Cr_2O_3 increased from $19.25 at the beginning of 1936 to $21.00 at the end of the year. These figures are somewhat higher than those that have been maintained for several years. The large demand for chromite in the past few years, together with accelerated armament activities abroad, the increases in ocean freight rates, and the shortage of available bottoms is reflected in the increase in the price of chromite, particularly in 1936 and 1937. During the last year there has been a dearth of spot ore.

While the use of chromite in all three principal outlets—the metallurgical, refractory, and chemical industries—is expanding, there appears to be no imminent shortage in supply for the chemical and refractory industry. New developments in the recent past have made available large quantities, which can supply requirements for a number of years. Metallurgical-grade ores of good quality are not as plentiful, but established consumers are reasonably assured of supply.

BIBLIOGRAPHY

** Seil, G. E., Chromite: Industrial Minerals & Rocks—Seely W. Mudd Series, Am. Inst. of Min. & Met. Engrs., New York, 1937, p. 201.
1. Canadian Chemistry and Metallurgy, Leather and Tanning Chemistry: Vol. 19, no. 10, Oct. 1935, pp. 270-271.
2. Chambers, Gordon H., Chromite: Foote-Prints, vol. 8, no. 1, June 1935, pp. 1-8.
3. Chemical Industries, Bichromates: Vol. 40, no. 1, January 1937, pp. 23-25.
4. Diller, J. S., Chromite in 1918: Mineral Resources of the United States, 1918, Part I, Metals, U. S. Geol. Survey, pp. 657-723.
5. Doerner, H. A., Roasting of Chromite Ores to Produce Chromates: Rept. of Investigations 2999, U. S. Bureau of Mines, June 1930, pp. 1-29.
6. Doerner, H. A., Concentration of Chromite: Rept. of Investigations 3049, U. S. Bureau of Mines, November 1930, pp. 1-8.
7. Fisher, Lloyd W., Origin of Chromite Deposits: Econ. Geol., vol. 24, no. 7, November 1929, pp. 691-721.
8. Furness, J. W., The Chromium Situation from a Domestic Standpoint: Inf. Circ. 6038, U. S. Bureau of Mines, June 1927, pp. 1-11.
9. Koster, J., Studies on the Treatment of Domestic Chrome Ores. Progress Reports Metallurgical Div., 13, Electrometallurgical Investigations: Rept. of Investigations 3322; U. S. Bureau of Mines, October 1936, pp. 3-27.
10. Murphy, Walter J., Imports 216,600 tons, Production 700 tons: Chemical Markets, vol. 30, no. 5, May 1932, pp. 451-454.
11. National Resources Board, A Report on National Planning and Public Works in Relation to Natural Resources and Including Land Use and Water Resources with Findings and Recommendations: Washington, 1934, pp. 444-446.
12. Nevin, Charles M., Chromium: Foote-Prints, vol. 1, no. 3, pp. 18-27.
13. Ridgway, Robert H., Shifts in Sources of Chromite Supply: Inf. Circ. 6886, U. S. Bureau of Mines, July 1936, pp. 1-11.
14. Ridgway, Robert H., Chromite: Minerals Yearbook, 1937, U. S. Bureau of Mines, pp. 633-640, and previous issues.
15. Ross, Clarence S., Is Chromite Always a Magmatic Segregation Product: Econ. Geol., vol. 24, no. 6, Sept.-Oct. 1929, pp. 632-641.
16. Roush, G. A., Strategic Mineral Supplies—4. Chromium: The Military Engineer, vol. 27, no. 152, pp. 130-137, and vol. 27, no. 153, pp. 214-218.
17. Sampson, Edward, May Chromite Crystallize Late: Econ. Geol., vol. 24, no. 6, Sept.-Oct. 1929, pp. 632-641.
18. Sampson, Edward, Varieties of Chromite Deposits: Vol. 26, no. 8, December 1931, pp. 833-839.
19. Sampson, Edward, The Marketing of Chromite: Eng. & Min. Jour., vol. 115, no. 8, Feb. 24, 1923, pp. 356-358.
21. Smith, L. A., Chromium—General Information: Inf. Circ. 6566, U. S. Bureau of Mines, April 1932, pp. 1-31.
22. Wagner, Percy A., The Chromite of the Bushveld Igneous Complex: South African Jour. of Sci., vol. 20, no. 1, Oct. 1923, pp. 223-235.

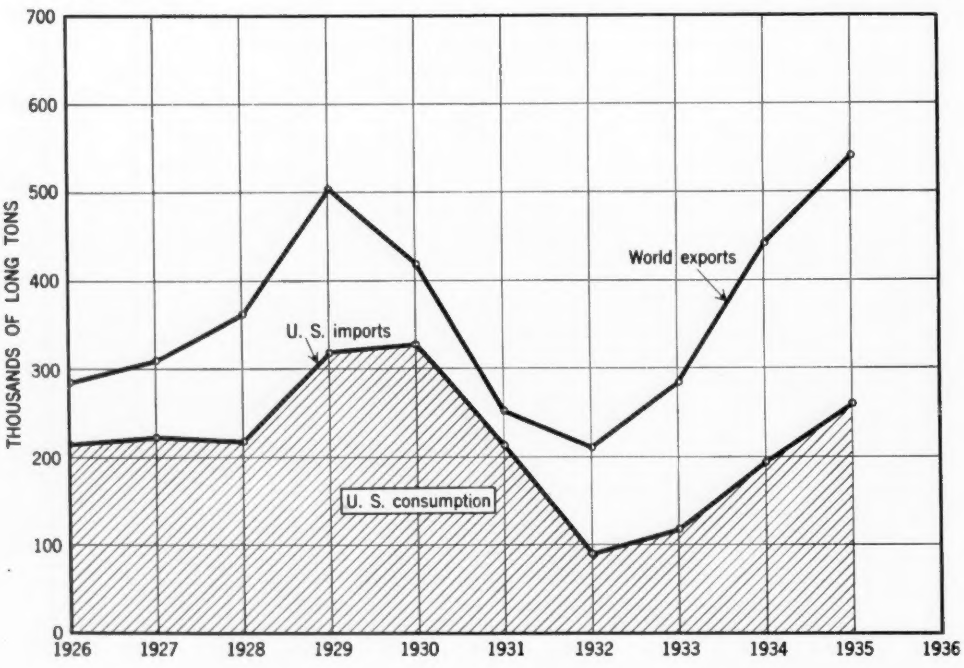


Figure I
World exports and United States imports of chromite.

Chemical Chronology, 1937

January

Social Security Law in effect Jan. 1. ● E. R. Weidlein, new president, A.C.S.; Dean Frank C. Whitmore, president-elect. ● Thos. Midgley, Jr., recipient Perkin Medal '37. ● Dr. Lawrence W. Bass returns to Mellon Institute, Assistant Director. ● S. O. C. M. A. re-elects August Merz president, tenth term. ● Freeport Texas changes company name to Freeport Sulphur. ● S. W. Jacobs, as president, heads Chlorine Institute. ● Jos. Turner & Co. office transferred to new plant at Ridgefield, N. J. ● Cabot Carbon begins carbon black plant, West Texas. ● West End Chemical sued for million dollars accumulative capital stock dividends. ● American Turpentine Farmers Ass'n starts cooperative research and advertising campaigns. ● Pittsburgh Plate Glass purchases block at 5th & Ruskin Aves., Pittsburgh, for erection new research laboratory. ● Du Pont enlarges, by 50%, technical laboratory, Deepwater, N. J., dye plant. ● U. S. Circuit Court declares Wagner Labor Relations Law unconstitutional in its provision for collective bargaining. ● Swift & Co. begins $750,000 oil refinery in Newark. ● Deaths: Dr. Julius O. Stieglitz, 69, retired administrative head, Dept. Chemistry, University Chicago, and former A. C. S. president; Fred. W. Anderson, 85, founder Anderson Chemical; Lester Wittenberg, 60, Barrett executive vice president; Herbert I. Allen, 61, treasurer, Electron Chemical, developer of Allen electrolytic cell.

February

Cyanamid acquires business and plant of Chas. H. Stone, Inc., Charlotte, N. C. ● C. Leith Speiden, vice president Innis, Speiden since '15, resigns. ● Dr. Herbert Newby McCoy '37 Willard Gibbs medalist. ● Atlas Powder takes over manufacture Revolite. ● California Chemical bought by Westvaco Chlorine. ● Chemical fellowships awarded annually by du Pont increased to 6 post-doctorates and 18 post-graduates for '37-38. ● To Dr. A. J. Fischer, Dorr Co., the Kenneth Allen Memorial Award, by N. Y. State Sewage Works Commission. ● Named as regional vice presidents, National Mfrs. Ass'n, S. Bayard Colgate and Lammot du Pont. ● Davison Chemical reorganizes subsidiaries, Central Chemical, Miller Fertilizer, and G. Ober & Sons. ● Net value Herman A. Metz estate $493,342. ● General Dyestuff's new laboratory and executive building, 435 Hudson St., N. Y. C., opened. ● U. S. Potash offers 25,000 shares ($100 par) 6% cumulative preferred. ● C. K. Williams Co. wins National Pigments & Chemical suit involving dispute over terms of two patent license contracts. ● Rubber Service Labs. Division Monsanto opens new service laboratory at Akron. ● Du Pont to declare "interim" dividends each quarter on common instead of "regular" quarterly dividends, depending on prevailing conditions at that time. ● Deaths: John Paul Laffey, 74, retired general counsel and head du Pont's legal department; George Morgan Snow, 78, former du Pont New England representative; W. G. Griesemer, vice president and treasurer, Black Flag Co.; Gustave Knecht, 61, managing partner, Braun, Knecht and Heiman.

March

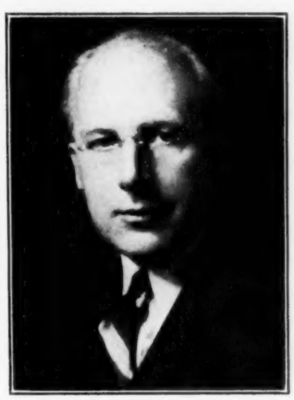
Fred M. Becket and E. R. Weidlein elected trustees, American Institute. ● United Carbon takes group life insurance for employees and dependents. ● American Cyanamid buys H. A. Metz Co., manufacturer textile and tanning specialties. ● Congressman Patman introduces Bill (H. R. 4726) to prevent reciprocal agreements between buyers and sellers. ● Ansbacher-Alton's plant, Sodus, N. Y., burned, loss $25,000. ● United Carbon sets new record carbon black sales '36, net profit $2,202,850. ● C. I. O. fails to organize Kanawha Valley plants of du Pont and Carbide. ● Hercules declares $1.50 share dividend on common. ● Wood Flour's plant, Manchester, N. H., destroyed by fire, damage, $40,000. ● James G. Marshall, Union Carbide and Electro Metallurgical, '37 Schoellkopf medalist. ● American Cyanamid & Plaskon Corp. settle conflicting patents in urea resin field. ● General Plastics, No. Tonawanda, N. Y., two new additions, cost, $32,000. ● Wm. H. Nichols gold medal to Dean Frank C. Whitmore. ● Freeport Sulphur, subsidiaries, net income '36, $2,009,783. ● Isco Chemical Division, Innis, Speiden, adds to carbonate of potash manufacturing unit. ● Hilton-Davis Chemical, Cincinnati, purchases 45 acres adjoining plant, for additional unit. ● Deaths: Victor Bloede, 88, manufacturer starches and philanthropist; J. C. Bates, 76, prominent southern textile chemist.

April

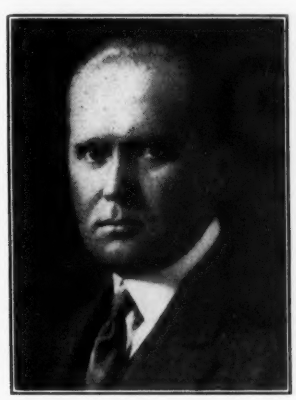
A. E. Staley Mfg. offers 75,000 shares $5 cumulative preferred, no par, and 570,000 shares common, $10 par. ● Chas. Lichtenberg, new president, Chemical Salesmen's Ass'n. ● N. Y. Paint, Varnish & Lacquer Ass'n celebrates golden anniversary at Waldorf-Astoria. ● Edw. A. Orem promoted sales manager acids and heavy chemicals for Grasselli Department, du Pont. ● Chemical company earnings announced top records for '36; Allied Chemical net profit $25,323,834; Carbide largest in history, exceeding '35 by about 35%; Air Reduction record net $7,064,553; Heyden, $555,540; American Commercial Alcohol, $1,187,232. ● Stephen L. Tyler,

E. R. WEIDLEIN
President
American Chemical Society

JAMES G. VAIL
Chairman
Amer. Sect. Soc. Chem. Indust.



FRED. C. ZEISBERG
President
Amer. Inst. Chem. Engineers



E. M. ALLEN
President
Manufacturing Chemists Ass'n

new executive secretary, A. I. Ch. E. ● Witco Carbon becomes Continental Carbon, to avoid conflict in names. ● E. G. Robinson elected director, du Pont. ● Clemmensen Chemical, Newark, N. Y., new producer fine chemicals. ● Union Bag & Paper makes initial shipment 4,200 tons sulfate pulp, made from Georgia pine, to its northern mills. ● Crude naphthalene declines 15c. ● Phillips Petroleum and United Carbon, jointly, to construct and operate carbon plant in Sunray field, Moore County, Tex. ● Mathieson, Columbia, and Southern Kraft divulge plans new plants. ● E. A. Hults, Mathieson, and Andrew Fletcher, St. Joseph Lead, to board trustees, Air Hygiene Foundation, Pittsburgh. ● Southern Dyestuff announces plant addition, to increase capacity one-third. ● Pittsburgh Plate Glass and Corning Glass form Pittsburgh-Corning Corp. ● Roxalin Flexible Lacquer, lacquers and synthetic finishes, adopts profit sharing plan with employees. ● Cyanamid purchases Air Reduction subsidiary, Calcyanide Co. ● General Chemical acquires Mechling Brothers Chemical, Camden, N. J. ● Deaths: Dr. Allan F. Odell, 51, director chemical research, du Pont's Arlington, N. J., plant; Jos. C. Neustaedter, 76, auditor and director, Church & Dwight; Dr. Max Wallerstein, 63, chemist and founder, Wallerstein Labs.; Walter A. Kochs, 41, secretary, Victor Chemical Works.

May

II GEMINI

International Printing Ink rechristened Interchemical Corp. ● U. S. Supreme Court upholds open formula fertilizer law, the 3c lb. levy on first domestic processing cocoanut oil; prohibits use "sweet" gas in Texas for carbon black manufacture. ● Medal A.I.Ch. to Dr. James F. Norris. ● Demand for industrial chemicals slackens considerably. ● Maj. Gen. Walter Campbell Baker, new chief, Chemical Warfare Service. ● American Section, Society Chemical Industry, elects James G. Vail, chairman. ● Michigan Chemical, Saginaw, Mich., organizes subsidiary, Michigan Salt. ● Jefferson Lake Oil begins production sulfur at Clemens Dome. ● Northwood Chemical, Phelps, Wis., organized for production wood chemical products, including activated carbon. ● Parke-Davis and Rumford Chemical employees "sit-down"; Viscose comes to agreement with C. I. O.; National Aniline at Buffalo and Niagara Sprayer both raise wages 10%; General Aniline plant employees at Rensselaer, N. Y., vote down C. I. O. ● Cresylic acid advanced sharply on scarcity. ● Fire destroys Merck Montreal warehouse, damage $120,000; also bentonite plant, Wyodak Chemical, Jerome, Utah. ● Walter J. Trautman sells stock in Allied Industrial Alcohol, retires from presidency. ● Fertilizer sales make new records. ● Senator Bilbo, Miss., introduces Bill (S 2140) to further chemurgic research of southern agricultural products, by U. S. Dept. Agriculture. ● Armour Fertilizer Works takes over phosphate holdings of Armour interests in Maury Co., Tenn. ● First quarter reports Carbide, Monsanto, du Pont, Atlas, Catalin, Mathieson and National Oil Products show better sales and profits. ● New $1,000,000 National Oil Products chemical specialties plant, Cedartown, Ga., opened. ● Vanadium Corp. applies New York Stock Exchange to list 95,120 additional capital shares and cancel previously authorized listing of 62,500 shares. ● New Mellon Institute dedicated. ● Personal property Miner-Edgar Chemical, Sutton, W. Va., sold to Kulka Iron & Metal for $41,500. ● Du Pont announces disability payments for non-occupational sickness or injury. ● Farm Chemurgic Council, third annual meeting, Dearborn, organizes on independent basis. ● U. S. District Court upholds patent Phosphate Recovery Corp. in decision against Southern Phosphate: infringement Chapman-Littleford patent for concentration minerals, issued in '34. ● Deaths: Fred. Wheeler White, 73, chairman board and former president, Mutual Chemical; Cornelius K. G. Billings, 75, chairman board, Union Carbide; Dr. Wallace H. Carothers, 41, du Pont research chemist.

June

69 CANCER

Henry Treide, Davison Chemical, trustee, Peabody Institute, Balto. ● Shell Development offers University of California fellowship; to maintain laboratory with full-time research fellow and assistant. ● Executives discuss industry's problems at M. C. A.'s 65th annual meeting, Seaview; E. M. Allen, president. ● National Cylinder Gas, Chicago, new plant for manufacture oxygen and acetylene gas, Dallas. ● Mifflin Chemical, Phila., indicted for alcohol diversion. ● Imports chemical raw materials rise sharply first half of year. ● Bradford Oil Refining, Bradford, Pa., construction 600 bbl. acetone-benzol dewaxing plant. ● Naval stores producers organize into self-help marketing group, Turpentine Farmers Trading Co. ● Relatively high level superphosphate production continues. ● Monsanto, subsidiaries, sales and earnings, three months ended June 30, establish new, all-time quarterly peak. ● Exports and imports fertilizers expand; exports increased 18% in tonnage and 85% in value over June '36; imports 61% in volume and 68% in value. ● Reilly Tar & Chemical closes Granite City, St. Louis, plant. ● Current demand for heavy chemicals continues to shrink. ● Merck '36 sales set new record, net income $1,048,222. ● Fertilizer companies resume dividends: Virginia-Carolina and Davison both after eight years; International Agricultural after six. ● C. I. O. disturbances in smaller chemical plants; union contracts broken at Monsanto, Bower, and Dennis; trouble in Tennessee phosphate fields; du Pont workers organize own union. ● Nitrate of soda quoted $1 ton higher. ● Half year's chemical exports set new records; gain almost 20%, reaching level only 15% below that recorded in same period '29. ● Publicker Commercial Alcohol, construction storage and distribution plant, costing over $100,000. ● Du Pont raises working capital $50,000,000; sale 500,000 shares accumulative $4.50, no par preferred, for expansion program. ● Deaths: Harry Walter Cole, 55, vice president, Baird & McGuire; Oliver Goldsmith Carter, 63, president, C. W. H. Carter, Inc.

July

♌ LEO

Ozark Chemical, Tulsa, Okla., to manufacture hydrochloric acid and sodium phosphate for oil well treatment. ● Chemical employees favor own organizations to outside unions at Solvay's Hopewell and Calco's Bound Brook plants; labor troubles in Tennessee phosphate fields. ● Dr. Chas. L. Mantell resigns Pratt Institute faculty, to full-time director research, American Gum Importers Ass'n. ● Alkali prices reported unchanged for last half. ● New research laboratory building at Shell Petroleum's Wood River refinery opened. ● Bakelite wins against Beck, Koller, suit involving latter's application to register "Beckacite," "Beck-O-Lac," and "Beckoloid" as trade marks. ● University of Edinburgh honorary LL.D. to L. H. Baekeland. ● Acute shortage of many coal-tar chemicals. ● Du Pont's safety record for '36 announced lowest in history. ● Chartiers Oil builds natural gas purification plant near Kenova, W. Va., to supply Carbide. ● U. S. I. Alcohol sues in U. S. District Court at N. Y. for refund of $625,113.97 plus interest for Federal taxes paid '27. ● Spain's position as supplier pyrites, due to civil war, lost in current trade. ● World production chlorine estimated by *Die Chemische Industrie* to be between 600,000 and 700,000 tons a year. ● Carnegie-Illinois Steel, subsidiary U. S. Steel, contracts with Semet-Solvay for world's largest benzol refining plant at Clairton, Pa. ● To Wm. L. Hale, LL.D. degree from his alma mater, Miami University. ● Benj. T. Connor new vice president Colt. ● Good demand for citric, tartaric acids. ● American Enka completing $1,000,000 expansion and improvement program at Asheville plant. ● Central Chemical Corp. of Va., Harrisonburg, Va., formed, capital $100,000. ● Canadian Industries, Ltd., building electrolytic plant, Shawinigan Falls, Que., to cost over $2,000,000. ● Valley Fertilizer & Chemical, Jackson, Va., incorporated for $100,000. ● Stock market stages sharp recovery; chemical stocks appreciate $350,741,304. ● Monsanto registers 50,000 shares $4.50 cumulative preferred, Series A, no par value, with SEC, proceeds for capital additions, replacements, expan-

sion, etc. ● Solvay American Investment changes name to Solvay American Corp., applies to list on New York Stock Exchange 139,648 shares 5½% cumulative preferred ($100 par). ● Net value chemical stocks on New York Stock Exchange July 1, $6,185,872,487, with average price of $72.56; January 1 same stocks had value of $6,502,233,633, and average price of $79.60. ● Jap-Chilean agreement for ten year period on iodine. ● Deaths: Edw. M. Johnson, 58, vice president, Arnold-Hoffman & Co.; Wm. Lesser, 85, an organizer of Hudson Aniline, which later became General Aniline; Dr. Clement Oscar Kleber, 74, president, Clifton Chemical Labs.; Prof. H. E. Armstrong, 89, dean British chemists; Frederick J. Maywald, 67, consulting chemist and pioneer Florida phosphate mining industry.

August

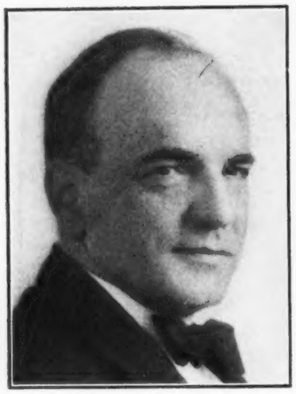
Lead pigments advanced, first rise in four months. ● Labor outlook improved in chemical companies. ● Rainier Pulp & Paper to erect $6,000,000 sulfite mill at Fernandina, Fla. ● Dr. Marston Taylor Bogert elected Honorary Fellow, Royal Society, Edinburgh, Scotland. ● Calcocraft, independent vertical union Calco employees, applies to National Labor Relations Board for election to determine collective bargaining. ● Hercules offers stockholders rights to new common at $75 a share in ratio one to ten held. ● George Cooper, Diamond Alkali, vice president in charge sales, succeeding Fred. G. Lancaster. ● Consolidated Chemical Industries, new muriatic plant at Ft. Worth, Tex. ● '36 bromine production up 25% in quantity and 15% in value, over '35. ● Alcohol makers, using blackstrap, fight proposed tax; amendment to sugar quota bill would add 7½c gal. to cost. ● Sherwin-Williams declares extra $1 to regular quarterly dividend of $1 on common. ● Southern Alkali to build chlorine plant at Corpus Christi, Tex. ● Victor Chemical concludes 20 year contract for T. V. A. power, to erect $1,000,000 furnace plant, Mt. Pleasant, Tenn., for processing phosphate rock. ● Atlantic Refinery starts Philadelphia refinery, first plant in east to purify refinery gas by phenolate process. ● Linde Air Products constructs large oxygen plant in So. Chicago. ● Atlas Point plant (Atlas Powder) for mannitol and sorbitol, near Wilmington, Del., opened. ● Du Pont leases 70,000 sq. ft. from Henry Bower Chemical Mfg. Co., at Grays Ferry Road, Phila., for expansion purposes. ● Tide Water Associated Oil, polymerization plant, Avon, Calif., refinery, in construction, selects Girdler process for removal hydrogen sulfide. ● C. E. Adams now chairman board, Air Reduction, C. S. Munson, president. ● Lindsay Light & Chemical resumes common dividend, last previous August '36. ● Standard Oil (N. J.) offers new aromatic naphthas for application in nitrocellulose lacquers and synthetic enamels. ● Standard Oil (La.), construction new $500,000 non-selective polymerization plant, Baton Rouge, La. ● Sodium nitrate schedule revised upward. ● W. Newton Long resigns Davison Chemical to become president, Miller Chemical & Fertilizer. ● U. S. I.'s Balto. plant employees organized as U. S. I. Alcohol Employees' Ass'n, Inc., under Maryland charter. ● Industrial chemical demand seasonally slow. ● Floor Wax Ass'n organized. ● Order for 61 Koppers coke ovens placed by Ford. ● Exportation copper sulfate from Germany forbidden. ● W. C. Hardesty, Inc., glycerin and fatty acids, constructs new factory at Los Angeles. ● U. S. Senate authorizes export of helium for medicinal, scientific, and commercial purposes. ● National Labor Relations Board orders American Potash & Chemical to disband plant union and reinstate 19 employees, discharged for union activity. ● C. F. Garasche, new president, Titanium Pigment. ● American Commercial Alcohol and affiliate, American Distilling, transfer business, good-will and permits to Commercial Solvents. ● Deaths: Philip C. Meon, 51, vice president, treasurer and director, Borne-Scrymser; Horace Willard Hooker, 61, vice president, treasurer and director, Hooker Electrochemical; Prof. C. R. Price, 68, noted Carbide chemist; Chas. Rogers Lindsay, Jr., 63, prominent chemical manufacturer; Marshall A. Smith, 68, chairman board, Smith Agri. Chem.

September

Linseed oil futures opened to trading N. Y. Produce Exchange. ● Fire destroys fertilizer plant Rogers & Hubbard, Portland, Conn., damage $150,000. ● A. C. S. at Rochester for 94th meeting. ● National Aniline new phthalic anhydride plant at Buffalo. ● Work begun on direct acetic acid unit at Newberry Lumber & Chemical's plant, Newberry, Mich. ● Ansul Chemical, Marinette, Wis., new two-story building. ● Texas Technological College honorary D.Sc. to C. W. Seibel, supervising engineer, U. S. Bureau Mines helium plant. ● Du Pont purchases 400 acres, Clinton, Iowa, for Cellophane plant; also plans $750,000 carbon bisulfide plant near Petersburg, Va., to be operated by Old Hickory Chemical Co. ● Fertilizer outlook less promising, farm income shrinks on falling agricultural prices. ● Shawinigan Resins Corp., Indian Orchard, Mass., formed to manufacture chemicals used by Fiberloid. ● Brown Co., Berlin, N. H., files plan for reorganization. ● Harshaw Chemical registers 59,458 common shares without par value with SEC. ● One unit du Pont's Baton Rouge, La., ethyl plant in production, final cost $3,000,000; another costing $2,000,000 ready early '38. ● Dr. Firman E. Bear, formerly Cyanamid, now scientific editor, *Country Home*. ● L. D. Burns & Co., Atlanta, Ga., new fertilizer brokerage firm. ● Survey by federal agencies and four western states to develop western phosphate deposits. ● Industrial chemical activity spotty, with exception products affected by Sino-Jap war which creates shortages. ● Western Barium Corp. completes first unit barium reduction and chemicals plant, Rosamond, Calif. ● Activated Alum takes over building, 16,000 sq. ft. floor space, Curtis Bay, Balto., operating in full production. ● Battelle Memorial Institute creates four Research Associates for year '37-'38. ● J. L. E. Cheetham production manager du Pont's ammonia plants moved to company's general offices, Wilmington, Del. ● P. & G. celebrates 100 years; announces elaborate expansion plans here and abroad; largest, $1,000,000 addition to factory, Long Beach, Calif. ● Glidden registers with SEC 78,400 12-25 shares, no par common. ● African Metals Corp. organizes Industrial Sales Corp., to take over its chemical, steel, and cement business. ● Deaths: Dr. Wilfred N. Stull, 61, Mallinckrodt vice president in charge operations and research; Noak Victor Hybinette, 70, internationally known chemical engineer and metallurgist; Allison Bishopric, Sr., 66, president, Bishopric Products, and Natural Sodium Products, Ltd.; Eugene Merz, 68, general manager, Heller & Merz, for 30 years.

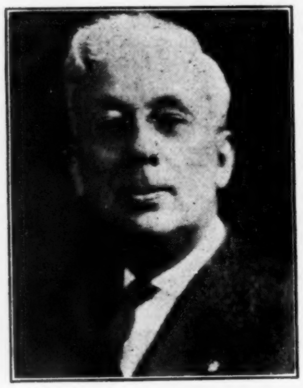
October

Dr. Wilder D. Bancroft and A. Cressy Morrison elected honorary members A. I. Ch. ● Competition drives vanillin prices down. ● Hercules Powder, in conjunction with Bleachers' Ass'n, Ltd., forms new English company, Holden Vale Mfg. Co., for manufacture chemical cotton. ● To H. Sidney Smith, Carbide consultant, Samuel Wylie Miller Memorial Medal, of American Welding Society. ● James G. Marshall, superintendent, Carbide's Niagara Falls plant, receives Jacob F. Schoellkopf Medal. ● Industrial chemical shipments decline sharply. ● Construction: Freeport Sulphur, $300,000 program at Port Sulphur mines in La.; Virginia-Carolina, $200,000 sulfuric plant at Birmingham, Ala.; Mountain Copper, slime plant near Matheson, Calif.; Hooker Electrochemical, $40,000 addition to plant and laboratory at Niagara Falls, N. Y. ● U. S. output mercury in '36 lower, being 16,569 flasks compared with 17,518 in '35. ● Dr. John H. Northrop, Rockefeller Institute for Medical Research, Princeton, N. J., Chandler medalist. ● Abbott Labs. forms Abbott Labs. of England, Ltd. ● Labor troubles continue: A. F. L. charges Calco with favoritism; Reilly Tar signs with Mine Workers affiliate. ● Anti-freeze market steady in early fall stage. ● Du Pont awards 24 chemical research fellowships. ● Stock values crash on record trading, chemical stocks off 11.5% in value; Allied off 30¾ points this month. ● National Lead's chief chemist, Dr. Gustave W. Thompson, honorary

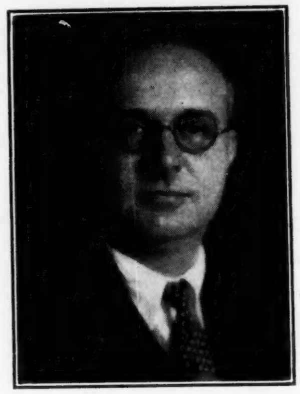


DEAN FRANK C. WHITMORE
Nichols Gold Medalist

E. J. CRANE
Chemical Industry Medalist



DR. JAMES F. NORRIS
A.I.Ch. Medalist



THOS. MIDGELY, JR.
Perkin Medalist

membership, A.S.T.M. ● Cabot Carbon completes Girbotol purification unit in new gasoline plant, Kermit, Tex. ● Columbian Carbon's carbon black sales 28% ahead of last year. ● Titanium Pigment's paper development laboratory moved to N. Y. City from Brooklyn. ● American Cellulose & Chemical starts new rayon plant, Narrows, Va. ● Ass'n American Railroads petitions I. C. C. for proposed freight and passenger rate increase totaling over $5,000,000. ● U. S. production printing ink '35 rose 32% over '33 figure. ● Hilton-Davis, Cincinnati, plans $1,000,000 building and expansion program. ● Monsanto sells sintered phosphatic materials, processed in Maury County, Tenn., plant, to T. V. A. ● Electro-Metallurgical, Carbide subsidiary, contracts with T. V. A. for plant at Wilson Dam. ● National Cylinder Gas, Chicago, acquires control Carbo-Oxygen Co., Pittsburgh, and merges two companies. ● Wm. M. Rand, Monsanto, elected president Mass. Manufacturer's Ass'n. ● Deaths: Dr. Wilfred Greif, 54, first vice president and director, American I. G.; Francis P. Garvan, 62, head, Chemical Foundation, and leader Farm Chemurgic movement; Bernard J. Gogarty, 42, Commercial Solvents sales staff; Lord Rutherford, 66, director world famous Cavendish Laboratory, Cambridge University; Harry M. Riddle, 72, president, Asbury Graphite Mills; John Chas. Wolke, 45, executive sales manager, L. Sonneborn Sons, Inc.

November

Cyanamid expands Charlotte plant. ● Carbon black prices in three separate declines. ● Hercules splits common stock two for one. ● Kentucky Chemical Industries, incorporated in Ohio, capital $100,000. ● Coal-tar solvent prices renewed first half '38. ● Tennessee Mineral Products, headed by H. M. Lofton, of Chattanooga, to develop barytes deposits. ● Columbian Carbon, new $350,000 plant in Saxtet oil field, near Corpus Christi, Tex. ● Sale Standard Chemical Works, near Reading, Pa., to Allegheny Chemical, price $47,000. ● Steel production sharpest decline on record. ● Chemical companies profits drop in third quarter. ● Sidney B. Haskell to Barrett as vice president, in charge ammonia department. ● Jones & Laughlin, new sulfate warehouse and bagging plant at Memphis. ● G. F. Coope succeeds Col. Robt. Marsh, Jr., as president, Potash Co. of America. ● Abbott Labs., new 50,000 shares cumulative convertible preferred, $100 par. ● Monsanto wins *"Chem. & Met."* '37 award for engineering achievement, for phosphorus plant near Columbia, Tenn. ● Hercules, Texas Gulf, Carbide, Atlas Powder, Cyanamid, du Pont show increased profits in third quarter. ● Standard of N. J. declares extra of 75c share, in addition to regular semi-annual dividend of 50c on capital stock. ● National Pest Control Ass'n new name of National Exterminators & Fumigators. ● Possible spring shortage of sulfate of ammonia forecast. ● Penn Salt to construct sodium chlorate plant near Bonneville Dam, Ore.; Chipman Chemical, Bound Brook, N. J., to distribute. ● Commercial Solvents Peoria, Ill., plant employees vote against granting exclusive bargaining rights to A. F. L. affiliate. ● E. J. Crane, editor, *Chemical Abstracts,* receives Chemical Industry Medal '37. ● Stocks drop for fourth consecutive month. ● Fred. C. Zeisberg, du Pont vice president, elected president, A.I.Ch.E. ● Dr. Elvin H. Killheffer, du Pont, succeeds late Francis P. Garvan as president, U. S. Institute for Textile Research. ● Compressed Industrial Gases plans new $350,000 plant at Evansville, Ind. ● Fritzsche Bros. to take over and develop Kleber property (aromatic synthetics) at Clifton, N. J. ● Du Pont, new production unit for industrial finishes at Ft. Madison, Iowa. ● Dr. Thos. H. Norton, Cyanamid technical staff, Lavoisier medalist, Society Chimique de France. ● Great Western Electro Chemical purchases 10 acres at Martinez, Calif., for expansion. ● Air Reduction takes over Crystal Carbonic, Charlotte, N. C. ● Thos. S. Nichols, formerly Grasselli, now a vice president, Prior Chemical. ● S. B. Penick & Co., N. Y., crude drugs, etc., purchases Murray & Nickell Mfg. Co., Chicago. ● Dr. Paul D. Merica, director research, International Nickel, '38 John Fritz gold medalist. ● Deaths: Arthur David Armstrong, 55, secretary, Fritzsche Bros.; Hilon H. Sawyer, 81, well known chemist in essential oil field; Edw. N. Boice, 60, treasurer, Hanson-Van Winkle-Munning; Robt. E. Perry, sales mgr., T. Shriver & Co.

December

Armour, Chicago, acquires site in Houston, Tex., for new vegetable oil refinery. ● Euston Lead, Scranton, Pa., enlarged plant facilities, now 12,000 tons white lead annually, against 8,000. ● Vanadium Corp. resumes dividend payments, last previous Feb. '31. ● W. M. Rand, vice president, Monsanto. ● Texas Gulf declares extra dividend of 50c a share, plus dividend of 50c; du Pont pays $2, same as year ago; Cuban-American Manganese declares 20c on 8% Class A Preferred; Monsanto votes $1 extra on common. ● '36 world production superphosphate highest ever recorded. ● Prof. James E. Kendall, Dept. Chemistry, Edinburgh University, Scotland, gives $1,000 to A. C. S. for '38 award in pure chemistry. ● Bidel & Walden and J. A. Lambert Co. merge into Minerals Trading Corp. ● Henry L. Doherty, president, Cities Service, awarded Anthony F. Lucas gold medal by American Institute Mining & Metallurgical Engineers. ● Warwick Chemical, textile chemical specialties, West Warwick, R. I., purchases plant at Rock Hill, S. C. ● Dexter North, former Chief, Chemical Division, U. S. Tariff Commission, with Arthur D. Little, Inc. ● American Lumber & Treating, Chicago, leases Central of Georgia creosote plant at Macon, Ga. ● National Ass'n Mfrs., at annual meeting, adopts program of restoring and maintaining economic prosperity and stability. ● Philip M. Dinkins elected chairman, Drug, Chemical and Allied Sections, New York Board of Trade. ● Deaths: Dr. Chas. H. La Wall, 66, prominent pharmacist, dean Phila. College Pharmacy; Giles W. Mead, 71, retired, one of the three founders of Union Carbide; Dr. Sanja Schwabacher, 46, president, S. Schwabacher & Co.

What's Wrong with Patents?

Part II

By Dr. William M. Grosvenor

THE loss of so many valuable patent rights when brought to trial may be prevented. There are in fact, two helpful precautions which combined are generally effective. What they are may be judged by the histories of patents which survive. Only a few such cases need be cited.

A man had patented a lumber-drying system which he had applied in a limited way. Imagination hinted and small tests indicated that it might be adapted for solvent recovery. Tests with one of the largest users and losers of solvents in the country proved that it was applicable to the recovery of about 80% of the mixed-solvent used. This process and the adapted apparatus were then patented with the cooperation of the best of independent patent counsel and an engineer who had advanced training in physics. For a time after the full installation was completed, it saved about four hundred dollars a day. Then the whole business and plant were bought up for that one feature, almost as soon as the first patent issued. The price paid with no hesitation at the first interview was the first "negotiating" price asked; double the full value of the whole business including all equipment, patents, designs, good-will, etc. The purchase was made by a much larger corporation which had hitherto shown small respect for patents.

In another instance an eminent lawyer called on a consultant to assist a company in the prosecution of an application which had been urgently pressed in the Patent Office for two years with no allowance. The inventor was no longer with the company and his cooperation could not be obtained. Investigation of the products obtainable by his methods and repetition of the experiments indicated in his notes showed that he had carefully concealed the broadest and most valuable aspects of his invention. It was impossible to secure from him the oath necessary either to include them or to refile. However, "clarifying" amendments to the specification and claims were filed. When the examiner raised the question of "new matter," tests were made before him to "illustrate the meaning of portions of the original specification." It was thus possible to secure claims which included this broader embodiment of the invention. That patent was broadly sustained against four defendants in three different circuits for about ten years. By that time, a large business had been established to resist competition, before the patent was limited to its original disclosure about four years before it expired.

During the War, some foreign products were practically unobtainable here. A couple of chemists undertook to produce one of these. They could only make a product of very poor quality and obtain very poor yields. However, they decided to protect the development so far made, by preliminary application at least, and sought an older chemist and an attorney for advice as to patenting. The former first enquired what they knew about the procedure abroad (a carefully guarded secret). His questions as to just what they did and why were so acute and suggestive that they were able to perfect the process while the published art was being fully searched. The application then prepared, filed and allowed, dominated the field in this country, practically without competition, when the patents expired.

One of the great patent lawyers frequently advised the desirability of independent technical criticism and assistance in the drafting and prosecution of any patent applications that seemed to promise considerable value. The consultant whom he suggested in one instance had considerable litigation experience in a related field and believed in digging deep for his foundation. He combed the prior art. As the prosecution of the application and its offshoots proceeded, practically all the existing pertinent art was, at the suggestion of the consultant, injected into the file wrappers during the six years of intermittent work on the prosecution. Seven or eight patents matured and were all issued together. Meanwhile infringement had developed to equal the magnitude of the legitimate manufacture. After the patents issued, the consultant who knew something of the industry, was asked to lay out a technical plan for the exploitation of the patents. This was followed and, within a short time, infringement practically ceased without any actual trial.

A middle-West paint manufacturer came to New York lawyers with what he thought was an entirely unique paint. The attorneys sought technical assistance. The product was made and tested in various ways, and proved to be even more unique than the inventor supposed. Working with the attorneys an application was drawn and prosecuted with the support of these tests and a patent was secured which appears, eleven years later, to be practically uninfringed.

One of the first companies in the synthetic resin field had its own patent department and an independent advisory counsel. Among other applications pending was an old one that they had struggled over for years but which was at last up for final allowance in rather

narrow and useless form. One man in the company happened to know about the application and insisted on discussing it with an outside consultant before it was abandoned or issued in its limited form. His idea was sound. He and the consultant carefully analyzed the original disclosure for all its possible teachings. Then they considered what effect the corporation's monopoly of every one of these teachings separately might have upon the industry. The consultant emphasized the importance of knowing the real facts as to each of the important novelties suggested in the original draft. He was authorized to make a careful systematic series of tests of each of the two most important teachings, and verified them. The original application was then placed in the hands of outside counsel, was revised, clarified and prosecuted with the detailed technical facts to support it. It was broadly allowed and shortly came to be considered by others, as well as by its owner, the dominating patent in the field.

Every one of these cases was filed and prosecuted by outside counsel. Also, in every case, the outside law firm had the further cooperation of an independent technical consultant with considerable experience in litigation. One must conclude that the old-fashioned method of placing valuable patent applications in the hands of skilled and experienced outside men constantly engaged in litigating as well as soliciting patents, appears to get results which are valuable beyond all proportion to the added cost.

Large corporations, in aiming at efficiency and economy through organization and specialization, seem to have gone too far in undertaking to prepare for themselves their defenses for intangible property in inventions of large prospective value.

Some few years ago advice was asked how this could best be remedied by a corporation of moderate size which depends largely on patented developments to maintain its position in the industry. It was suggested that the prosecution of patent applications for those inventions which promise exceptional value be placed in the hands of independent legal and technical men experienced and actively engaged in patent litigation, *assisted* by the corporation's men and facilities. Upon request for more specific suggestions a procedure was suggested and later carried out, somewhat as follows. An outside patent counsel of ripe and successful experience but still active in litigation, and an outside general consultant experienced in litigation in various industries, were selected and placed on the patent committee. That committee included strong executive representation because Patents were as important to the extended life of the company as Sales or Finance. It was instructed to meet monthly to consider corporation inventions and proposed patent purchases or sales. It was to classify all inventions owned or controlled by the company or considered for purchase, sale or license. The least important were to be classed as "minor" or routine inventions; and those which might be or become of importance when investigated and understood, as "possibles." Finally, those few which clearly promised to be of great importance and value to any of the work the corporation did or planned were to be graded as "specials." At each succeeding meeting, the committee was to consider briefly any radical change in the prospective importance of inventions previously classified.

"Specials"—inventions which appeared to the committee to hold reasonably assured promise of outstanding importance—were to be kept entirely out of the routine control of the patent department. The latter's advice, cooperation and assistance, however, are valuable. When an invention is made "special" the inventor is sent to the outside counsel and consultant, taking with him a copy of a draft of the specification (if any) or the file wrapper (if any), his own notebooks, drawings, and samples, and any other available data regarding the invention and the related art. He is instructed to hold himself primarily and fully at the disposal of these two outside men till further orders. Before long this technical consultant became also a member of the "Board."

Regarding the general overall value of the procedure, it is perhaps impossible yet to make very positive statements. Some facts, however, are already apparent.

The minimum cost of operation of the plan is between \$5,000 and \$15,000 a year. Practically all cost appropriated for further legal and technical work on particular patents is completely offset by decreased expense of investigation and preparation by counsel and experts, whenever in one year (or possibly even two years) the first litigation under any single one of the "specials" is prepared for trial. This is true *whatever* the Court's final decision in the case may ultimately be. That much of the preparation of counsel and experts for the trial will already have been done. The increased "chance" of a favorable decision by the Court under any one of these "specials" can, of course, only be estimated. However, its chance appears to be vastly improved. There are few, if any, ghastly last-minute surprises, excuses for blunders, or regrets that some important teaching or claim is lacking in the patent. But it is quite clear that such procedure in securing patents finds its greatest value in *avoiding* the necessity of taking the patents so prepared into court at all. These patents have had all the prior art dug up with no reliance on the examiner. They have had the application attacked in advance of issue by men who knew the art, the science, the engineering, the law, the technique of trial and the trend of judicial opinion. All this leaves its marks in the file-wrapper and the patent when issued. Counsel for defendant are not slow to note these evidences. They realize that any prior art which has been considered and found wanting by the Patent Office has already lost half of its force before the Court. They find reasons for thinking this or that defense has been anticipated and blocked. Conse-

quently they are much more apt to advise making some sort of amicable settlement, than to advise a ride to a probable fall, reflecting no credit on their own firm.

Smaller manufacturers can apply the same principles on a smaller scale. Some technical man, experienced in patent litigations, who is to work with the patent counsel, can be given authority and asked to consider and report every promising novelty that is suggested, whether tried out or not. The head of the firm can meet monthly for a few hours with his patent counsel and his technical man. They might even meet for lunch or dinner, but all side issues must be rigidly barred. This conference is as serious and important as the monthly balance sheets. If not, there is at least one very vital matter to be discussed: "Why isn't it as important? Is the concern really dead, or only asleep on its feet?" Recently, two moderately small concerns have lost exclusive rights to several hundred thousand dollars' profit a year each, just because they had no currently interested and informed outsiders to wake them up and start them moving to protect themselves two years before it was too late.

Men in the corporation patent departments may be better informed on the art, more experienced in routine prosecution of applications, and more familiar with changing Patent Office practice than consultants—even than older patent counsel. Such abilities are valuable. The corporation's men also have considerable experience in research and technical factory procedure. Their comments, criticisms and suggestions would all be gratefully received, appreciatively considered, analyzed and used as fully as possible by the outside men who are responsible for the success or failure of the patent when litigated. In that matter the corporation men as a rule cannot possibly have the ripe experience in litigation and the balanced judgment as to the bearing of what they have to contribute, upon the whole case. This they more frankly recognize and admit to the outside specialist. With an outsider having no *personal* axe to grind except success in court, they quickly recognize that there are *other* things equally important, if not more so, which only long experience in patent litigation may teach. The bigger the outside man the more he welcomes suggestions, sees any value they possess, uses them and credits their origin. Such contacts would conspicuously increase the usefulness of the department men to their corporation. No one is quicker to recognize all this, or more anxious to cooperate than the corporation employee the instant he meets it in an outsider whose sole interest is *mutual* success in the venture, and who has no other personal interest to serve. Then the corporation man is quick to recognize that it is just those *other* things with which he is *un*familiar that are apt to be the chief uncertainties—the chief requirements for the ultimate object of every valuable patent—the things which determine success or failure in its prosecution against infringers.

"The play's the thing," and every well-conducted prosecution under a patent is a play, painstakingly developed with its own stage technique and its own special kind of "players." Its purpose is to present an instructive and impressive lesson regarding an *event in technical history*. Its success depends and must depend upon a true, unshakable story in the specification and claims which skilled playwrights have drawn to fit *all* the pertinent historical facts; upon technical and other assistants who permit no false actors or properties upon the stage unchallenged; above all, upon a director who knows his play, his characters, his assistants and his audience. Then conviction will grow in strength and firmness in the mind of the Court as all of the facts and arguments are finally presented, in their proper relations to the law which is in the hands of the Court. The cost of staging is often high, but the box receipts go where the Justices decide that the most worthy service on the whole has been done.

The foundation of it all is "The patent in suit."

Industry's Bookshelf

Industrial Cold Adhesives by Roger duLac, trans. by J. L. Rosenbaum, Lippincott Co., Phila., 192 pp. A handbook and formulary for all types of adhesives, valuable alike to user and maker.

The Electrochemistry of Solution by S. Glasstone, Van Nostrand, N. Y., 551 pp. A new edition of this careful text on theoretical electrochemistry, almost entirely rewritten as to the matter of electrolytic dissociation, overvoltage, and solvent equilibria.

How to Get the Order by Harry Simmons, Harper, N. Y., 137 pp., $2.00. Not "pep talk": practical, helpful suggestions and ideas for the salesman.

The March of Science by various authors, Pitman, N. Y., 214 pp., $1.25. A composite review of scientific progress compiled by authority of the Council of the British Association of the Advancement of Science: plain spoken and authoritative, one of the best of its kind.

The Delaware Corporation by Russell Carpenter Larcom, Johns Hopkins Press, 199 pp., $2.25. A painstaking study of "liberal corporation law" and its effect upon corporate structure and capitalization.

The Biochemistry of Cellulose, etc. by A. G. Norman, Oxford Univ. Press, N. Y., 232 pp., $5.00. A much needed summary, well done, of recent advances in biochemical knowledge of plant structural materials.

Thermodynamics by Enrico Fermi, Prentice-Hall, N. Y., 160 pp., $1.60. An aerial view rather than a close-up study—based on Professor Fermi's course of lectures at Columbia last year.

ABC of Agrobiology by O. W. Willcox, Norton, N. Y., 323 pp., $2.75. A study of plant life that anyone in the fertilizer industry can read with immediate profit.

Trade Centers and Trade Routes by Eugene Van Cleef, Appleton-Century, N. Y., 307 pp., $3.50. Cities, towns, and villages considered as centers of distribution and production—the modern point of view of city boosting and city planning combined admirably.

How Can the Industry Get and Hold Competent Technicians?

Third Instalment

Three Things Lacking

By O. F. Tower
Professor, Chemistry
Western Reserve University

Our principal difficulties are (1) lack of sufficient space for graduate work, (2) a need of more scholarships to attract worthy students, and incidentally (3) we find the student's preparation has occasionally been inadequate.

Send Employees to College

By Alfred H. White
Professor, Chemical Engineering
University of Michigan

Industry, of course, wants only the best men. One way to attract good men is to reward those who do good work so that the opinion will spread downward into the colleges and the high schools that it pays good men to enter a particular field. Our executives are awakening, or perhaps I should say, have awakened to this viewpoint and are offering good wages to men who are just leaving college. It is necessary that they look after these men and promote those who are competent if they are to receive an enthusiastic response when they continue to request men from the colleges. The grapevine route leading back from the man in industry to his friends in college works quite effectively.

Industry can also help in the selection of young men going into college by cooperating with local engineering societies in meeting high school boys and discussing with them the various fields which might be open to them. The high school boy and the chemistry teacher in the high school are very often quite ignorant of the demands which the industrial world makes on its engineers. Summer employment is, I believe, one of the ways in which the industries might be most helpful in determining the fitness of college students for their work. A student who is in his third year may be put into a plant and almost earn his salary. It may be preferable for a student in chemistry to enter the laboratory, but we prefer that our chemical engineers go into the plant and work under a foreman. The thing that is most important for them to learn is the way a foreman handles a gang of men. We do not care whether they get any technical information or not in this first summer's contact. This is a relatively inexpensive way for a company to become acquainted with students who may later enter their services. I believe it is a good investment for the company.

The demand for chemical engineers is almost as high today as it was in 1929. In our own department we have had 82 employers since December 1, 1936, asking us to recommend chemical or metallurgical engineers to them. In 26 cases these letters have been followed by personal interviews here in Ann Arbor by personnel men from the company. In a good many other cases the company has paid the expenses of one or more men to their home office in order to have personal interviews before employment.

These employers are looking sometimes for graduates from a four year course and sometimes for men who have a Master's or a Doctor's degree. If they are looking for graduates from the four year course, they naturally try to employ the best men. On the other hand, there is a great demand for men with graduate training and those with keener minds should be the ones encouraged to go into graduate work. If industry employs the best seniors, there will only be second rate men to continue in the graduate field Fortunately, there are some seniors who are so determined to do graduate work that they resist all offers of employment. The concrete suggestion which I would make to industrialists in this connection is modeled after the plan employed by the U. S. Navy. In the Navy, junior lieutenants are permitted to apply for assignment to the post-graduate school for further training. The group selected spends one year at the post-graduate school; a second year at some university, and a third year on shore at Navy yards or other government establishments.

I suggest that our industries look over the college graduates who have been with them about two years and pick out a few to be sent at the company's expense to selected schools for graduate work. If these men were paid $75.00 a month while they were at school, it would come close to defraying their actual expenses, and even if it does not, I do not see why the student should not pay part of his own expenses. The industries would thus have men coming back to them with graduate work who were trained in the desired field and were also familiar with the company's methods and problems.

The Costs of Training

By Alexander Silverman
Head, Department Chemistry
University of Pittsburgh

A student training for a Bachelor's degree in chemistry or chemical engineering will spend four years at an approximate cost of $1,400 for tuition and fees. Room and board mean an additional $2,000. The educational institution he attends will have to supplement this amount by $1,800 for the four years. This comes either from endowments or state appropriations for which taxes have been levied. The approximate total cost of a Bachelor's degree is, on the above basis, $5,200.

If the individual continues with advanced studies towards a Doctor of Philosophy degree for another three years, the cost is increased by $3,900, making a total investment of $9,100.

A study of science buildings provided in the last twenty-five years in the United States will make it clear that most of the laboratories which are devoted to chemistry, chemical engineering, and related sciences have been provided by philanthropists who were not scientists and who were not direct beneficiaries from chemical industry. Very few of our laboratories in educational institutions have been provided by chemists, chemical engineers, or their industries.

One cannot count fellowships, which rarely bring a return to the institutions themselves, as donations. They do further pure research, whose publication is important. In a few instances, they provide some equipment which becomes the permanent possession of the educational institution, but in the long run they leave little to improve the status of the colleges and universities, except the glory of publication.

It would seem from an analysis of the above figures that chemical industry owes a real debt to institutions of higher learning. This obligation could be met in a number of ways:

1. By the presentation of buildings and a sufficient endowment at least to insure maintenance;
2. Further endowments to insure adequate and timely equipment for advancing the science;
3. Endowments to insure a sufficient number of good teachers and adequate salaries for outstanding teachers;
4. Endowments to make possible the interchange of ideas through paid lectureships which shall be given by outstanding authorities;
5. Endowments to insure adequate and up-to-date library facilities;
6. Exhibits for university museums;
7. By establishing funds, the income of which may provide honors or awards to students for outstanding accomplishment;
8. By offering scholarships or fellowships to students of outstanding ability;
9. By providing pure research facilities to competent faculty men through the establishment of funds which will insure a lighter teaching load and, therefore, permit more time for scholarly advancement;
10. By granting permission to specialists from industrial establishments to offer lectures to students;
11. By facilitating plant visits, so that students may make industrial contacts and see the practical applications of the fundamentals which are taught.

It has been proposed by various men at various times that industrialists compensate educational institutions by paying so much per man for each individual sent by an institution, as this might insure a more even distribution of the responsibility than would result from voluntary gifts. The plan does not appeal to the writer, as it savors of the employment agency commission idea. Others have suggested that an association of chemical manufacturers set aside a definite portion of profits or earnings to subsidize higher education. This would seem a better plan if its execution is possible.

The conclusions drawn from this brief study follow:

1. Industrialists have a greater obligation to the graduates of our colleges and universities than has been met by the salaries which have been paid in the majority of cases;
2. Industrialists should pay that portion of the cost of training chemists and chemical engineers which colleges, universities, philanthropists, and tax-payers now bear;
3. Industrialists should provide buildings and endowments which will insure a sufficiently large and competent teaching staff, and adequately equipped laboratories and buildings;
4. In the interests of pure science, and in turn of industry, they should provide scholarships for exceptional, but needy, undergraduates, and research fellowships for especially capable graduate students.

What has been said assumes that industry benefits richly through the application of chemical science. This is really not an assumption, it is a well-established fact. As industry does more for education, its prospects and returns will increase accordingly.

Better Secondary Schooling

By P. A. van der Meulen
School of Chemistry
Rutgers University

It seems to be true that secondary school education, in general, has gone backward in the quality of its teaching in the past ten years. This statement is based on my observation both as a teacher of freshmen courses and as a parent with children of high school age. The general tendency of the secondary schools seems to be to reduce intensity of training, and to put too much time on non-essentials and "play-courses." One or two committee reports of the A. C. S. have called attention to this situation, but it cannot be emphasized too strongly that here is a real menace to the kind of preparation that technical students need.

Coming now to those students who plan to specialize in chemistry, we find that the severity of the training does not appeal to the student who is not genuinely interested, and as a result, the automatic selection that occurs reduces the large beginning group to a smaller group in the junior and senior years, and the members of this smaller group give little or no trouble so far as effort and capacity are concerned.

In any four year course in chemistry it is necessary to restrict the student to a rather narrow field. The cultural courses simply cannot be included to the extent that we would like to include them. This is a situation that cannot be helped unless we are willing to sacrifice thoroughness in the specialty.

If the leaders of the chemical industries will continue to emphasize the importance of intensive training, not only in the university, but also in the secondary schools, they will be doing a real service. If they will also impress on their boards of directors the necessity of maintaining high grade schools and that these require buildings and endowments, or in the case of state supported schools, liberal appropriations for buildings and for maintenance, a better understanding of our needs may result. If the operating and research managers will impress on the executive group, and if both managers and executives will bring to the attention of boards of trustees the needs of our technical schools for increase in both plant and personnel, they will be doing a real service. If they can persuade wealthy individuals to assist our boards of trustees with funds they will be doing a still greater service.

Brain Products and Pay Rolls

By Frank C. Vilbrandt
Head, Department of Chemical Engineering
Virginia Polytechnic Institute

Passing the buck is as natural for teachers in chemical engineering as for all other human beings. Industry fails the college student more often than the reverse. However, recalling past experiences with students in chemical engineering, it is quite pertinent to say that industry has held the men it got from the colleges, even during the depression. Colleges cannot complain about industries' treatment of chemical engineering graduates.

It is not expected that the raw material that comes to the university or college can be any more uniform than raw materials for an industrial plant. The inanimate raw materials are obtained on specifications, and industry also "purchases" its college employees on specifications.

Colleges would like to obtain its students on specifications. However, the task confronting colleges is to work over or process raw materials that are sent to them to conform to the specifications of industry. If industry cannot find a suitable raw material, it processes the available material at a cost. If it lays down specifications for its college employees, why should it not expect to pay the costs for its human raw materials.

Industry looks for "finished products" at no special cost to itself. It approaches colleges with the idea of selecting the outstanding student and will pay a minimum. If a student is really outstanding, why does not industry pay such men who have only bachelor degrees a stipend of $50 or more per week. After four years of intensive study the outstanding man is worth that much. He is a more "finished product" in the eyes of industry than the poorer type of graduate, of which there are many. But to a large number of "B" and "C" men, the added effort to give their best is not worth the candle when the outstanding student only gets a job more quickly, but never at any increased rate.

Just as materials in industry vary in value according to their quality, so do college students. From the high price of $50 per week for a bachelor, one can supply men who are $40, $30, and $25 men, for those positions which require types of work that need nothing better.

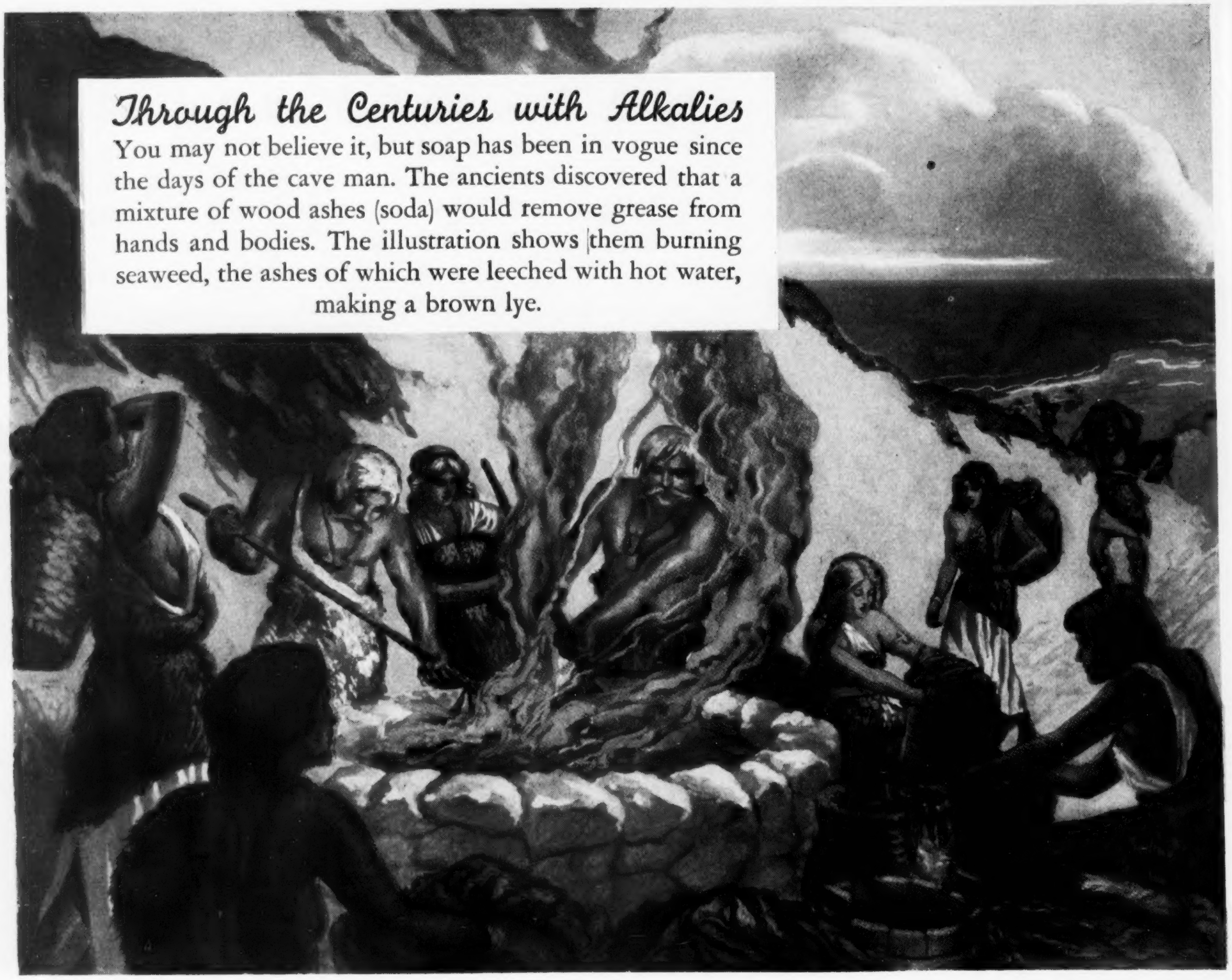
But, as in industry, if a cheaper raw material must be processed into more desirable material, so industry must (and many do) spend time and energy on training men to come up to the higher specifications.

College instructors have been with the students, and should be able to give a fairly accurate estimate of a student; naturally there are some who do not. But if the colleges were consulted for men on a basis of how much a man is worth and the work he must do, he would classify his men on the basis of their ability to meet specifications as a raw material or a more processed product.

Industry can help hold competent technicians if it pays for them, but it should pay right at the start and forget its "hazing" methods of low pay which are rather hard on the young man who is just finding out what life is, or who wants to find out what life is. If a poorer employee does not like his scale of pay, then it is up to him to work out his salvation himself, but industry should show him the way.

Give these young men a square deal right away. By this method industry would provide the incentive for better work among the students and consequently have better technicians in the long run. Industry expects finished engineers, but never wishes to pay for them. Colleges have their problems and difficulties with lack of funds to pay proper salaries and provide proper equipment for teaching the young men, but nothing is so discouraging to the teachers as a purchase of his products at bargain rates. If we can get a better price for our products, our renewed respect will enable us to solve many other local problems.

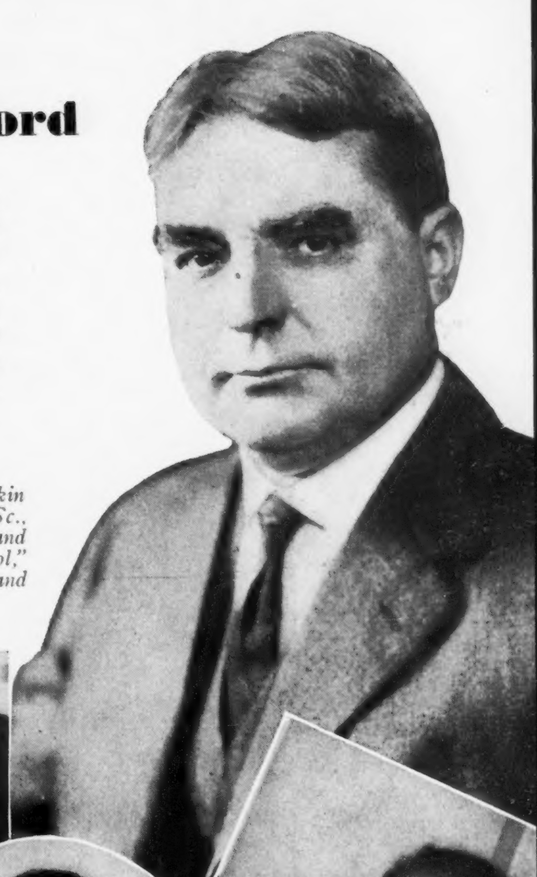
Give the graduates a break.


Through the Centuries with Alkalies
You may not believe it, but soap has been in vogue since the days of the cave man. The ancients discovered that a mixture of wood ashes (soda) would remove grease from hands and bodies. The illustration shows them burning seaweed, the ashes of which were leeched with hot water, making a brown lye.

Cyanamid's Research Workers at Stamford

Candid camera shots of some of the chemists and engineers who led by Vice President Whitaker work under six divisional directors: Dr. G. M. J. Mackay (research), Dr. Norman A. Shepard (sales service), Dr. R. Bowling Barnes (physics), Dr. L. J. Christmann (mining), A. S. Fromholz (chemical engineering), and Cyril B. Clark (patents) in the new laboratories of American Cyanamid Company.

President William B. Bell is a regular attendant at the staff conferences of the Stamford Laboratories.

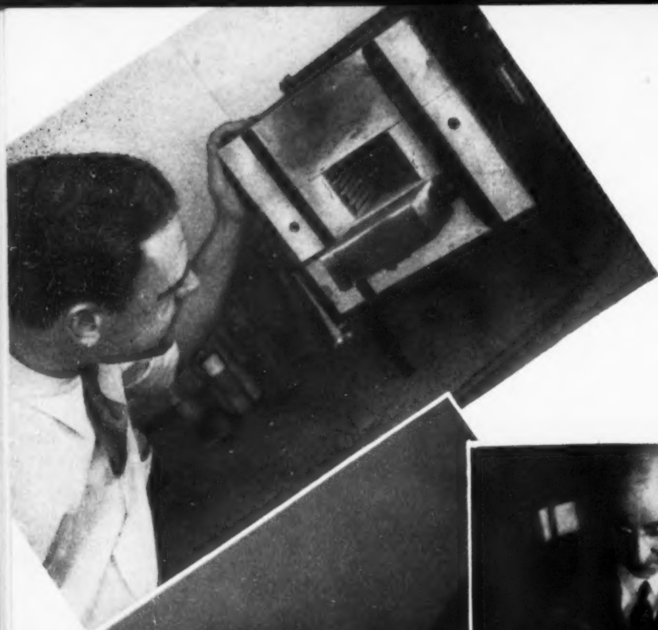


Milton C. Whitaker, Perkin medalist, honorary D.Sc., former college professor and president of "U.S.I. Alcohol," who heads up research and development work.

Director of patent and abstract work Mr. Clark (right) is also Dr. Whitaker's administrative assistant. Dr. Christmann (below right) with S. J. Swainson of the mining sales service.

Dr. Mackay's (oval) research laboratories are among the most completely equipped in the country while Mr. Fromholz's (right) pilot plants play a big part in the company's development program.

Dr. Shepard (below) works on technical problems with Cyanamid customers all over the world. Miss Margaret Carlson, the librarian, and (right) Dr. Barnes who is director of physical research.



In Cyanamid's Stamford Laboratories are carried on research and development work, analysis and testing, all patent searches and specification writing, technical sales service, thus centralizing all major activities and furnishing the basis of detail work done in various plants. Here is the mainspring, carefully tempered and well oiled, of the Company's vigorous, canny expansion program.

Housed in a vast "daylight" building on the Boston Post Road, formerly a silk yarn mill, the laboratory is notable for its spacious quarters. The research division occupies a floor, divided into great bays—an arrangement as different as possible, both physically and spiritually,

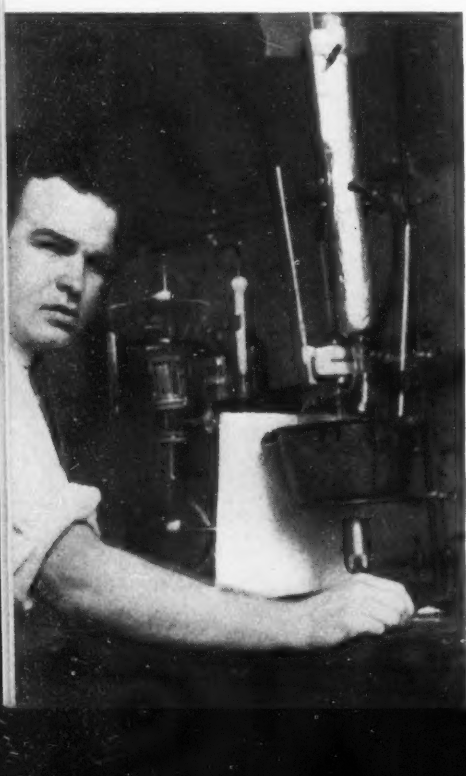
Staff photographer, G. Philip Ham, with his assistant, Wm. Letteris.

J. G. Niedercorn, in charge of leather chemicals service.

Dr. Robert B. Booth (in upper corner) of the mining research division and below him J. S. Meyer of metal trades service.

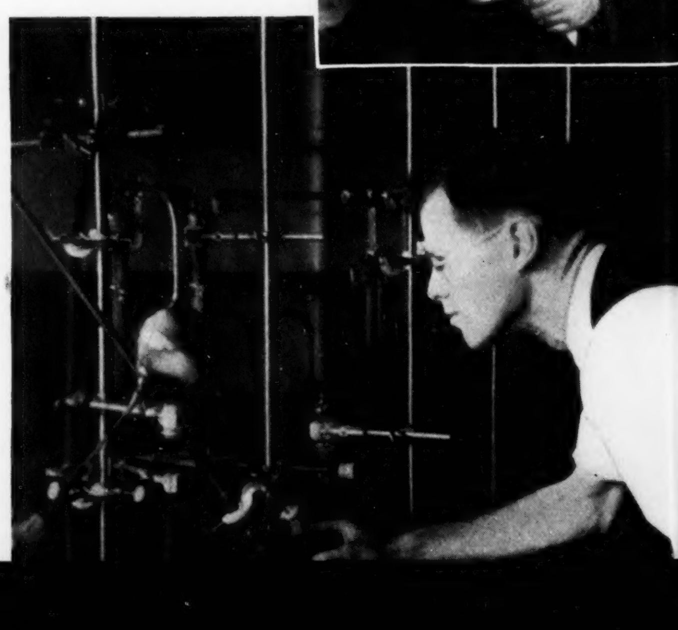
Engineers William F. Caldwell (right) and Thomas G. Moore study a new design.

Dr. H. S. Davis (oval) one of the veterans of chemical research.



Dr. Russell Dean (left) at a vacuum distillation apparatus working on alkyd resins.

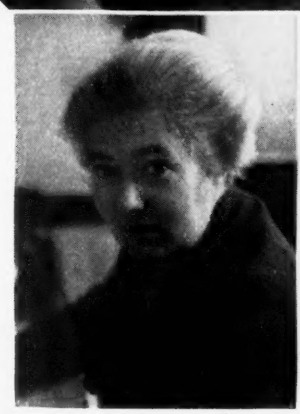
Dr. D. L. Fuller who is carrying forward studies on HCN.



from the alchemist's cubbyhole. Each bay houses a unit group working on such common problems as resins, fumigants, catalysts, pharmaceuticals, etc. Another floor is dedicated to technical sales service and here are miniature paper mills, vats, furnaces, flotation machines, all operated under controlled conditions to help apply Cyanamid products to the customer's best purpose.

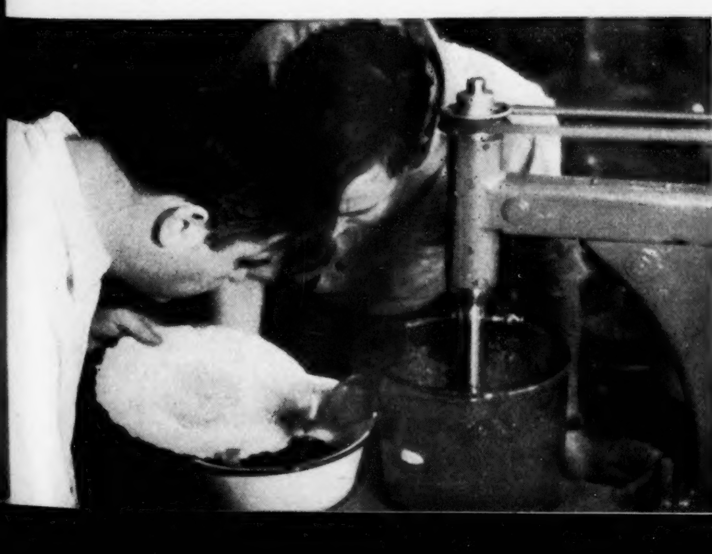
"Paper research" includes a file of U. S. and foreign patents, indexed fully; a library (largely of journals), the records of all original research, flow sheets with patent references of all Company processes—complete technical data immediately and completely available.

Entomologist Dr. William Moore works on insect control in model greenhouses. Dr. W. C. Hansen, mgr. Woodbridge (N.J.) plant, confers with Dr. H. W. Stiegler, in charge textile chemicals service.



Caroline Ward, Dr. Barnes' secretary, and (below) Dr. Shepard's "right hand," Lois Woodford.

H.B.Freeman (above left), New England salesman, brings a problem to C. G. Landes, assistant (center), and W.H.Harding in charge of paper chemicals service.

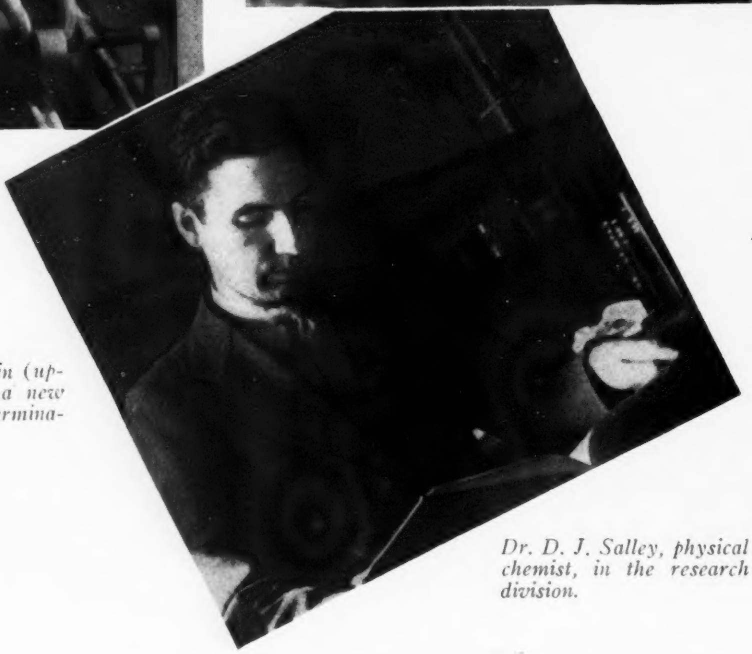


A. E. Anderson and Stephen Erickson running a flotation test on a Fagergren Laboratory Machine.

Eng. L. Boor (right) head of physical testing with an assistant, Albert F. Blockman.

T. F. Bradley in charge of Cyanamid's Rezyl resin research with W. B. Johnston (left) and Dr. E. L. Kropa (center).

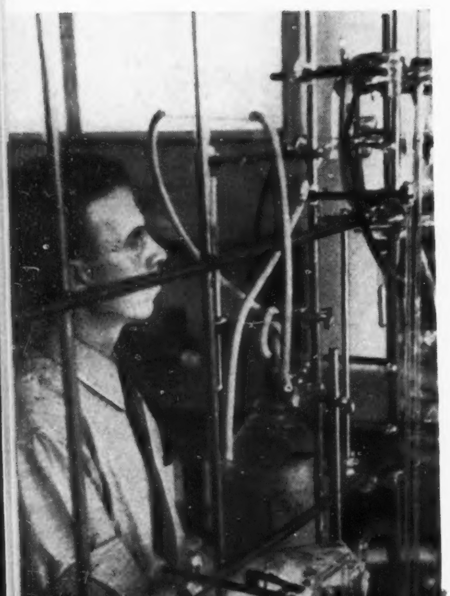
Dr. Robert C. Swain (upper corner) with a new melting point determination apparatus.



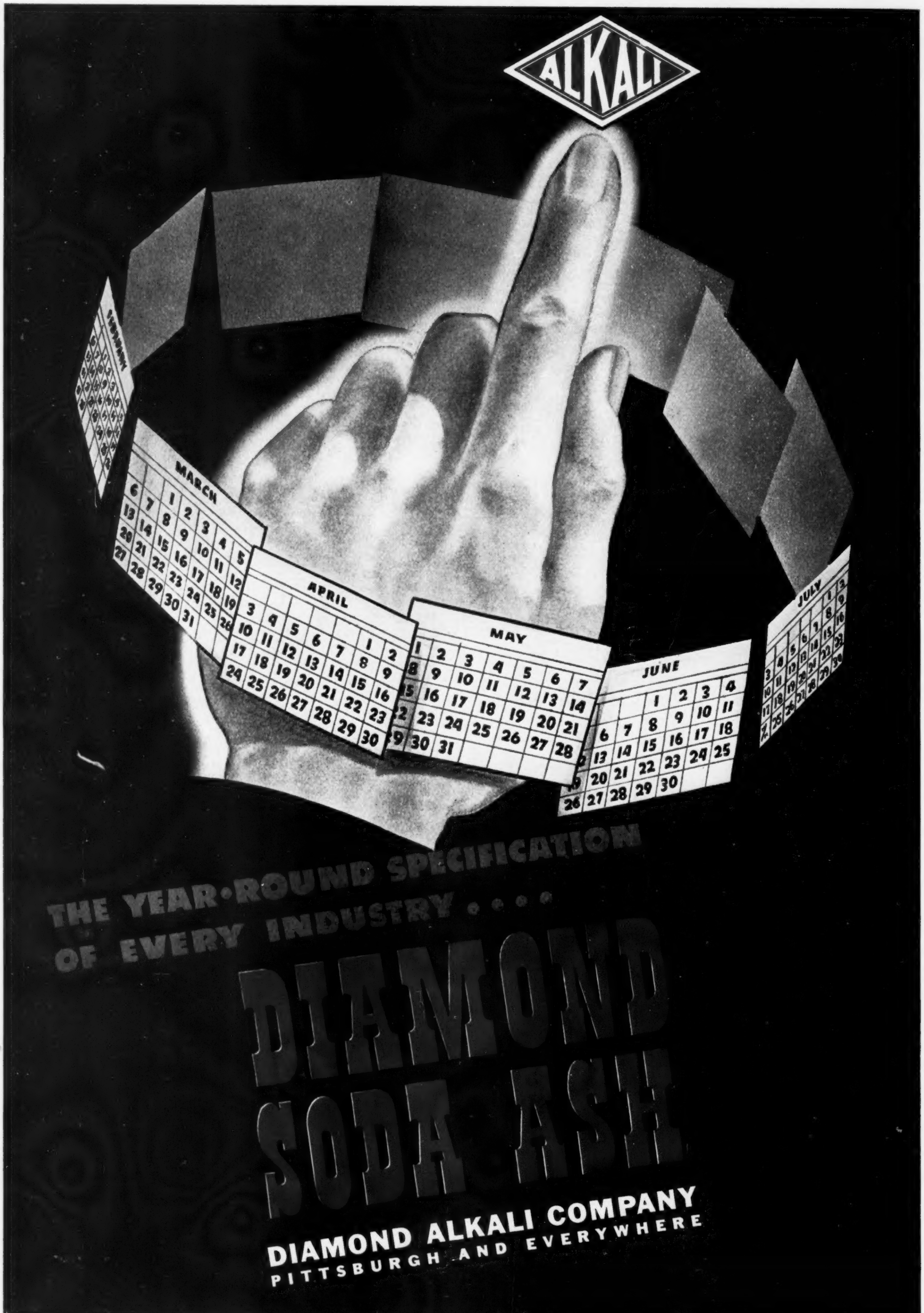
Dr. D. J. Salley, physical chemist, in the research division.

Urner Liddell (left) and Charles Stock with metal distilling apparatus, a miniature used on the 200 inch mirror for the Mt. Palomar Observatory.

Dr. Philip S. Winnek (below left) with Dr. Richard O. Roblin, Jr., who is in charge of organic research.



Dr. E. L. Carpenter (left) measuring the toxicity of fumigant gases.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THE YEAR·ROUND SPECIFICATION OF EVERY INDUSTRY . . . .
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PITTSBURGH AND EVERYWHERE

Plant Operation and Administration

A digest of new methods and equipment

Help in Selecting the Right Coal

By T. W. Harris, Jr.

Divisional Purchasing Agent, The du Pont Co.

AT the joint meeting, Pittsburgh, between the Coal Division of the American Institute of Mining and Metallurgical Engineers and Fuels Division of the American Society of Mechanical Engineers, many worthwhile papers were read and discussed, but most important from the coal selection standpoint was presented by Ralph E. Sherman, Battelle Memorial Institute, on the "Status of Our Knowledge of Coal Selection for Steam Generating Equipment." Mr. Sherman brought out that, enough information is available on all of the coals mined in the United States and the effect of their characteristics on the performance of all types of equipment that, if that knowledge were applied, selecting coal would not resolve itself into a trial of every coal available but should narrow down to a relatively few. Available knowledge is not being utilized.

The A.S.T.M. is developing a book comprising the symposium on the significance of tests of coal, together with the discussion presented at its last annual meeting. A series of pamphlets or manuals on selection and purchase of coal for the smaller plant is being prepared by Subcommittee XVII. In addition, a book on Coal Selection is to be published by Mr. H. J. Rose of the Mellon Institute.

There is a definite aim to develop and assign definite values to clinkering and smoking tendencies, size, coking characteristics, or ignitability of coal, and in a similar way fix various ranges of suitability for each of these characteristics with different types of burning equipment. Picture some future time when indexes have been set up and coals from all mines have been classified according to the various factors important for the proper selection of coals, which necessarily requires suitable laboratory tests for establishing same. This would be a great step forward although it will not be the final answer to coal selection for in the combustion of coal, the variance of factors have influences upon each other in different combustion installations so that it is very doubtful to the writer that, with all the future development, the final proper selection of coal will be accomplished other than by actual test.

The Fuel Committee of the National Association of Purchasing Agents have recognized that the purchasing agent is largely responsible for originating the sources of supply of coal at his plant or plants, and also that the information available which would assist in the proper selection of coal, has been highly technical, has been widely scattered, has been very largely specific rather than general in character, and that until recently, no efforts have been made to render to the purchasing agent combined information in usable form for his help and guidance.

This Association has therefore edited Pamphlet No. 21 (Second Edition) on "Factors Recommended for Consideration in the Selection of Coal." In this bulletin are listed 25 general uses of coal broken down according to combustion installations, and further broken down into combustion variations. Also in this bulletin, are listed 37 factors which would be considered in the proper selection of coals which include generally:

The Classification of Coals by Type, by Rank, by Grade.

Specific Chemical Properties of Coal according to the proximate analysis and including sulfur and phosphorus.

Specific physical properties of coal including caking properties, specific gravity and plasticity.

General characteristics including storage properties, handling properties, pulverizability, and potential smoke producing properties.

Included in these charts are a series of blanks, dashes, one star, two stars and three stars. These designations are filled in on the charts for each factor in coal selection as it is applied to the various uses broken down according to combustion installations and combustion variations. The blanks are for—future development; dash means—not important; one star—of ordinary importance; two stars—more than ordinary importance; and three stars—very essential.

Mr. Sherman in his paper referring to the above, stated, "One can imagine the confusion that arises in the mind of a purchasing agent when he first looks to this chart for assistance in the selection of the proper coal for use in his plant." With this very fact in mind, the Fuel Committee of the Purchasing Agents have contacted leading authorities on coal combustion and are now in the process of printing a series of articles the purpose of which is to expand and clarify the information contained in chart form in Pamphlet No. 21 referred to above. The papers published to date with their authors, are as follows:

No. 1—CLASSIFICATION OF COAL—by Arno C. Fieldner.

No. 2—THE SPECIFIC CHEMICAL PROPERTIES OF COAL AS SAMPLED—by J. F. Barkley.

No. 3—DISCUSSION OF FACTORS CONCERNING PENNSYLVANIA ANTHRACITE—by Paul A. Mulcey.

No. 4—THE SPREADER STOKER—by J. F. Barkley.

No. 5—THE HAND-FIRED DOWN-DRAFT FURNACE —by J. F. Barkley.

No. 6—FACTORS IN THE SELECTION OF COAL TO BE USED FOR THE FIRING OF CERAMIC PRODUCTS—by W. E. Rice.

No. 7—BRIQUETTING—by Dr. Floyd B. Hobart, Battelle Institute.

No. 8—SMELTING WITH COAL—by Clyde E. Williams, Director, Battelle Institute.

No. 9—USE No. 1—HAND-FIRED (a) BITUMINOUS COAL—by R. L. Rowan.

No. 10—SPECIFIC VOLATILE INDEX (S.V.I.) AS APPLIED TO THE VARIOUS USES OF COAL—by R. E. Gilmore.

No. 11—COLLOIDAL FUEL—by J. D. Doherty.

No. 12—USE No. 9—LOW TEMPERATURE COKE MAKING—by C. E. Lesher.

Four additional papers are ready for publication, as follows:

No. 13—USE No. 6—PULVERIZED COAL—by E. J. Billings.

No. 14—TRAVELING OR CHAIN GRATE STOKERS—by George P. Jackson.

No. 15—USE No. 7—GAS MAKING—A. COAL GAS—(1) HORIZONTAL RETORTS—by R. C. Downing.

No. 16—USE No. 7—GAS MAKING—A. COAL GAS (2) VERTICAL RETORT—CONTINUOUS—by S. J. Beale.

We are expecting, within the next few months, to cover generally, all the uses of coal and also give papers covering the factors to be considered for the proper selection of coal.

Pamphlet No. 21 was drawn up by Sub-Committee VI to the Technical Committee on Classification of Coal sponsored by the A.S.T.M. so the information published could include only actual facts as determined. It was necessary to use the form of stars, dashes and blanks to show relative importance for consideration. On the other hand, the articles being published by the Purchasing Agents following very closely to the charts, are more specific. A good illustration would be where "volatile," in Pamphlet No. 21, is two or three-starred for a specific use, the purchasing agent would not be informed whether low volatile, high volatile, or medium volatile was important, but only that volatile was of more than ordinary importance for consideration. On the other hand, from the articles, the results obtainable from various volatile contents in coal are explained.

To illustrate the application of Pamphlet No. 21 and accompanying articles on the selection of coal, we are citing a case in point: The purchasing agent is buying for a plant which has spreader stokers. He refers to Pamphlet No. 21, page 10, item 2, where the spreader stoker is listed. It is subdivided into combustion variations from "a" to "h" inclusive:

a. Normal conditions—or conditions with no specific or unusual problems of combustion.
b. Excessive load.
c. Undersize of combustion chamber.
d. Insufficient grate to heat area.
e. Unfavorable firebrick conditions.
f. Insufficient draft.
g. High cost of ash removal.
h. Slagging of boiler tubes.

He obtains from the power house, the conditions of combustion which apply to his specific problem and matches them up with the conditions of combustion as listed above. Then, by reading to the right on the chart in Pamphlet No. 21, he will find a number of blanks, dashes, one-stars, two-stars, and three-stars for his specific combustion variation as applied to the factors for coal selection; for instance, opposite "b" Excessive Load—Softening Temperature of Ash, Size and B.t.u., are two-stars and for Potential Smoke Producing Properties—three-stars, which immediately brings to his attention the fact that these factors in selecting the proper coal for his power house, if he has an excessive load condition, must be carefully considered in order to obtain proper selection.

Now, by referring to various articles which the N.A.P.A. are having printed on the factors and uses of coal, he will obtain further information to guide him in his proper selection of coal, as for instance, in this case, he should refer to Article No. 1—by A. C. Fieldner, on "Classification of Coal," Article No. 2 on the "Specific Chemical Properties of Coal," and two additional papers which will be printed on the "Specific Physical Properties of Coal" and "General Characteristics." In these four articles, he can look up and become familiar with the properties which he has found from Pamphlet No. 21 are particularly important in the selection of coal for his installation. Then by referring to the article No. 4 on the "Spreader Stoker" by J. F. Barkley, he will find a quite thorough discussion on the selection of coal for the spreader stoker.

As a result of his reference to Pamphlet No. 21 and these articles, he should be able to eliminate a number of coals offered for his installation which he can recognize as not being economically suitable and thereby be able to cut down to a reasonable extent, the number of coals suitable for boiler testing.

We all realize the limitations of the charts and even the accompanying articles. They are not offered to industries as a means of selling or buying of coal for any particular use. They will never be a substitute for the testing of coals nor will they in any way take the place of fuel engineers employed by the producers or the consumers. These publications of the N.A.P.A. are offered as an educational program, as a tabulation of information and with the hope that it will be possible for a buyer and a seller, with the help of these charts and articles, who have available comprehensive chemical and physical data for the coal or coals in question, together with a fair knowledge of the type and condition of equipment and operating conditions, in the case of the purchasing agent, to considerably narrow down the list of promising coals which should be subjected to actual plant proving; and, in the case of the seller, to confine within reason, his activities to the consuming points best suited for the burning of his coals.

Possibility of Synthetic Glycerin

The fact that it is now possible to prepare diethoxyacetone easily, cheaply, and with high yields, sufficiently so to form an economic and possibly competitive process for the manufacture of synthetic glycerin, was disclosed in a recent paper to the French Academy of Science by M. George Darzens.

Commenting upon this development, a writer in the *Perfumery and Essential Oil Record*, of November, points out that a considerable amount of attention has been devoted during the past fifty years to glycerin synthesis. The growing scarcity in many countries of this important product in face of the constantly increasing demands has re-directed research in this field, and particularly to the earlier work of Grimaux, which forms the basis of the present advance.

The most important of this earlier work was that of Grimaux and Lefevre, undertaken about 1887-8. Diethoxyacetone was prepared from ethoxyacetic ether, which was hydrogenated into diethyline in the cold, and this latter then de-ethylated into glycerin. At that time there was considerable difficulty in obtaining the diethoxyacetone.

This particular synthesis has now been revived by Darzens, who presented his first note on the subject in 1934. A substantial advance is made in that the necessary diethoxyacetone is easily and cheaply obtained in good yield from the corresponding ethoxyacetic ether, which is a raw material readily obtained in any of several different ways. The diethoxyacetone is again converted into diethyline, and this in turn into glycerin by de-ethylating, the latter process being effected by heating for eight hours at 120-125° in an enamelled autoclave or sealed tubes, with three to four times the weight of concentrated hydrochloric acid, the yield being 100 per cent.

Darzens' new method of preparing diethoxyacetone consists in the condensation of two molecules of ethyl-ethoxy acetate into the corresponding -acetone, using dry sodium ethylate in the presence of toluene.

It is understood from the *Chemical Trade Journal*, Dec 3, '37, p. 498, that large scale tests on the method are in progress, and that patents are being applied for to cover at least the production of diethoxyacetone by this method.

Ammonium Sulfate Without Sulfuric

The Hori process of ammonium sulfate production will be adopted by the Manchurian Chemical Industrial Co. in connection with its increased capacity project. Process, devised by Mr. Hori, formerly attached to the Tokyo Industrial Research Institute, is designed to produce ammonium sulfate by combining sulfurous acid gas with ammonia instead of the application of sulfuric acid adopted in the ordinary production process. No further details have been furnished.

Removal Sulfur from Gases

Dr. J. G. King (Chief Chemist, Fuel Research Station), in his recent William Young Memorial Lecture to the annual meeting of the North British Association of Gas Managers, stated that the most important progress in England, in the removing of organic sulfur from coal gas, has been the application of the Carpenter-Evans process by the South Metropolitan Gas Company.

Recent discovery of a satisfactory material for the removal of sulfur from water gas (E.P. 452,417 (1936)) offers a means of treating coal gas which the industry should not neglect to investigate. Process consists in passing the gas at 200°-230° C. over a contact material consisting of reactive oxides of iron containing more than 10 per cent. alkali carbonates. It is claimed that 1 lb. contact material will remove sulfur completely from 1,500 cub. ft. of water gas containing 13 grains of organic sulfur per 100 cub. ft. The sulfur removed remains in combination with the contact material. In an experiment at the Fuel Research Station, 1,500 cub. ft. of such gas was treated per pound, and only traces of sulfur were beginning to show in the purified gas.

Experiments upon coal gas are now going on and show some promise. The contact material becomes inactive in regard to organic sulfur after it has absorbed about 5 per cent. S by weight. It can then be used for removal of hydrogen sulfide in a normal oxide box. An increase of temperature to 300° C. allows the contact material to take up twice as much sulfur. It is probable, however, that this temperature is, for economic reasons, rather high, to suit gasworks practice.

Experiments in the United States have already indicated contact materials allowing a very much higher space velocity for organic sulfur (W. J. Huff and L. Logan, Amer. Gas Assoc. Proc., 1936, 724). In this work the organic sulfur is converted to H_2S to be removed subsequently. The most active catalysts were prepared from uranium oxide in admixture with copper or cerium oxide, and at 450° C. space velocities as high as 15,000 per hour were attained with almost complete conversion of organic sulfur to H_2S. *Chemical Trade Journal*, Nov. 26, '37, p. 484.

Electrolytic Caustic Soda Process

Increasing demand from artificial silk manufacturers for caustic soda as free as possible from sodium chloride and other impurities has led the I. G. to re-investigate the problem, with the result that they now propose a modification of their earlier heptahydrate process leading to production of caustic soda of approximately 99.7 per cent. purity.

Original process is described in D.R.P. 347,816, and covers a method for the production of caustic soda, low in sodium chloride, from electrolytic caustic soda lyes (cell liquors) concentrated to a content of 50 per cent. NaOH. By reason of this method of production, these lyes are saturated with NaCl and contain 2 parts of NaCl per 100 parts of NaOH, after being completely freed from floating salt particles. By diluting such a lye with water, to a NaOH content of 38 per cent., and cooling to temperatures of about 14° C., while stirring, so-called heptahydrate ($2NaOH.7H_2O$) is precipitated while practically all the sodium chloride remains in solution, since the limit of solubility of NaCl in the residual mother liquor is not attained.

In carrying out this so-called heptahydrate process, up to about 70 per cent. of the caustic soda present can be crystallized out direct, without being accompanied by any inconvenient deposition of NaCl from the correspondingly enriched mother liquor. It is better, though, to continue the cooling only to such an extent that a pulp still sufficiently fluid to pass through the pipes, and consisting of finely crystalline hydrate and mother liquor, has been formed. From this pulp containing solid and liquid components in approximately equal proportions, the crystals are separated in a suction filter or preferably in a centrifuge. The mother liquor can be again cooled in order to deposit a further 20 to 25 per cent. or so of NaOH. In such event the deposited hydrate contains about 0.6 per cent. of NaCl after being thawed out.

The obvious way of obtaining a greater degree of separation of the hydrate crystals from the NaCl-bearing mother liquor by more energetic and protracted centrifuging has been found impracticable because, owing to the structure of the crystals, the pulp cannot be freed from liquid much beyond the limit already reached under normal centrifuging conditions. The displacement of the mother liquor by a supply of water at a temperature considerably lower, 5° C., than the melting-point of the heptahydrate has not been found practicable, since this measure hardens the crystal mass to a degree which prevents the passage of the washing water.

It has now been found that the washing operation can be successfully carried out by the use of water at temperatures lying within the narrow range of about 10° to 14° C., and the process forms the subject-matter of E.P. 472,754, of 1936.

By the use of water at these temperatures, it is claimed, the yield of heptahydrate is not prejudicially affected, if slightly less water is employed than corresponds to the volume of mother liquor to be displaced. For example, a layer of the centrifuged material, weighing about 180 kgs., is sprayed by means of a spraying pipe, with about 5 kgs. of water at 12° C., and the loose, crystalline layer is detached by means of the scraper.

The heptahydrate thus obtained (about 172 kgs.) furnishes, on thawing, a caustic soda liquor containing only 0.2 to 0.1 parts of NaCl per 100 parts of NaOH. This soda lye (about 38 per cent. strength) is concentrated to a strength of 50 per cent., or fused to form the solid commercial grade, according to requirements, while the somewhat thinner mother liquor can be again frozen and centrifuged, after which the resulting mother liquor (high in NaCl) and washings are returned to the process. From *Chemical Trade Journal*, Nov. 5, '37, p. 407.

Pure Methane from Natural Gas

A method of obtaining pure methane from natural gas has been developed by Boomer, Johnson, and Thomas (*Can. Jour. Res.*, 1937, *15*, 360-362). The working of a laboratory purification unit dealing with 40 cubic feet per day is described.

The gas to be treated contained about 91 per cent. methane, and 3.5 per cent. ethane and higher hydrocarbons, with traces of sulfur compounds, the remainder being nitrogen, which was not removed. It was first dried by passage through calcium chloride, and then subjected to pyrolysis at 780° C. (optimum temperature), whereby, with a suitably adjusted rate of flow, the methane was entirely unaffected, while the whole of the higher hydrocarbons were converted to a mixture of olefines, aromatic compounds, carbon, hydrogen, and carbon monoxide, and sulfur compounds were converted to sulfuretted hydrogen. These products were removed from the treated gas by passage through a system containing a glass wool filter to remove carbon and some of the liquid compounds, soda lime to remove sulfuretted hydrogen, activated coconut charcoal to absorb liquid products and olefines, 95 per cent. sulfuric acid to complete the removal of olefines and unsaturated compounds, and to convert any remaining S compounds to sulfur dioxide, which was absorbed in a scrubber containing caustic soda. *Chemical Age*, Nov. 6, '37, p. 368.

New Equipment

Diesel Battery Line

A complete line of specially constructed batteries for Diesel starting service is announced by B. F. Goodrich Co., Akron, Ohio. In the line are four 6-volt types, two 8-volt types and ten 12-volt types. Eight of the batteries are of conventional construction and eight built with the Kathanode construction.

Tank Car Blower

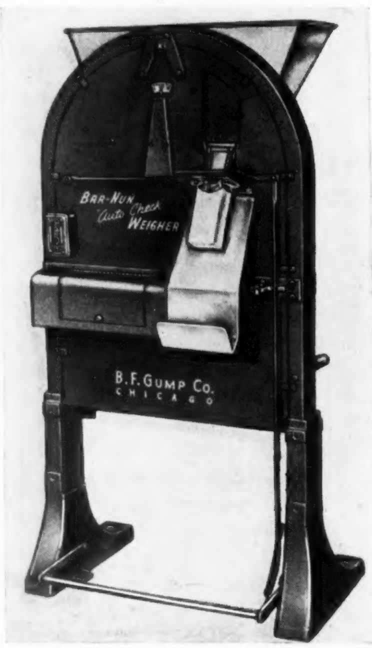
To solve the problem of supplying fresh air to men working within a tank car, the Coppus Engineering Corp., Worcester, Mass., has developed a new tank car blower, weighing about 55 lbs. and using a ¼ H. P. totally enclosed Universal motor. It is provided with a coupling for attachment to the nipple at the bottom of the tank car. Unit will deliver approximately 600 cu. ft. of air per minute which is said to be sufficient to thoroughly ventilate a tank car.

Explosion-proof Squirrel Cage Motors

Explosion-proof squirrel-cage alternating-current motors, (Type AA) with mounting dimensions conforming to N.E.M.A. standards, are being made by Reliance Electric & Engineering Co., 10888 Ivanhoe Rd., Cleveland, O. Motors have been tested and approved by The Underwriters' Laboratories for Class 1 Group D hazardous locations which include those in which flammable volatile liquids, highly flammable gases, mixtures or other highly flammable substances are made, used or stored in other than the original containers. All working parts are completely enclosed, and the housing is strong enough to withstand even an internal explosion without bursting, loosening the joints, or permitting flame to escape into the outside air. Rotors are integrally cast to assure reliability and uniformity of performance.

Auto-Check Weighers

"Stops those costly little leaks" is the slogan adopted by B. F. Gump Co., Chicago, for their new Bar-Nun "Auto-Check" net and gross weighers. The slogan embodies a brief description of the results obtained by these new automatic weighers, which are so extremely accurate in operation that the average commercial balance scale cannot detect the variation in weight. They guarantee a maximum variation within 1/64th oz. plus or minus.



Stubborn granular, powdered, flaked, or pulverized materials, in quantities ranging from ¼ oz. to ½ lb., are weighed, check-weighed, and filled into bags, cartons, envelopes or glass containers, in one speedy, automatic operation. A new, exclusive bag opener and holder is another outstanding feature of these weighers. This new device forever eliminates the difficulty usually encountered in handling small bags.

Automatic Proportioning Unit

An entirely automatic proportioning unit designed for continuous introduction of chemical solutions without attention to recharging requirements is a development of D. W. Haering & Co., Chicago, Ill. The Model "WW" Feeder is a standard type Model "B" Feeder constructed with an automatic recharge arrangement to cut down the size requirements. This unit proportions accurately, provides sight feed indication, prevents needle valve clogging and recharges itself whenever necessary. The only manual attention required is to see that the machine has an adequate supply of reagent connected to the supply line on the B compartment.

Dry Feeder Machine

Syntron Co., Homer City, Pa., announces a new model Dry Chemical Feeder Machine in a fully enclosed, dust tight, metal cabinet attractively finished in ivory colored enamel and polished aluminum. The major feature is the use of their "Vibra-Flow" Feeder Conveyor to control the rate of feed of the chemical. This is a trough, which, mounted on leaf springs and reciprocated by a small electro-magnet, flows dry chemicals by vibration. The rate of flow is controlled by varying the current to the trough's electro-magnet through a rheostat that with a calibrated, indicating meter is mounted in a control panel on one side of the machine. Material to be fed is stored in a built-in hopper which is equipped with a small, noiseless, electro-magnet vibrator that keeps the contents agitated to prevent bridging over and plugging up. An overhead chute can be sealed to the top of the cabinet for refilling the hopper from the floor above.

The unit is self-contained, operates on the ordinary 110 volt, A. C. lighting current, consumes very little power and the only installation work required is to pipe water to and from its vortex type solution pot. Capacity ranges from up to 100 lbs. per hour of light, fluffy material such as activated carbon, through up to 250 lbs. per hour of heavier material such as hydrated lime, on up to as much as 800 lbs. per hour of heavy material like alum, soda ash, etc. While designed primarily for the feeding of dry-chemical reagents in the treatment of water and sewage, it can also be used for the feeding of almost any dry or semi-dry material by the processing industries such as controlling the flow of material to pulverizers, mixers, dryers, screens, etc.

Pumping Unit for Viscous Liquids

A unique compact pumping unit for bulk transfer service where both thin and highly viscous liquids are handled is a development of Worthington Pump & Machinery Corp., Harrison, N. J. Pump is of the herringbone-gear-impeller type driven by a constant-speed motor or internal combustion engine through a two-speed, enclosed transmission. For light liquids, the pump may be operated at high speed, while for viscous liquids the speed of the pump may be reduced. In either case, the full power of the prime mover is employed.

Valves with Plug Type Disc

For severe service on small lines carrying steam, hot water, cold water, oil, gas and similar fluids, Crane Co., Chicago, offers a line of brass globe (No. 14½-P) and angle (No. 16½-P) valves with plug type disc of Crane nickel alloy and body seat ring made of Exelloy, a specially heat treated chromium iron. This combination of metals is considered ideal for seating surfaces, having excellent resistance to wear, temperature, galling and scoring. They are harder, stronger, and tougher than metals ordinarily used in brass valves. Made in sizes ⅛ to 3-inch, the valves are recommended for 150 pounds steam working pressure and 300 pounds on cold water, oil or gas lines.

Silica Gel Dehumidifying Equipment

The addition of silica gel dehumidifying equipment to the air conditioning facilities offered by Carrier Corp., Syracuse, N. Y., is a recent company announcement. This equipment, now fully developed and automatic in operation, consists of a series of silica gel trays or beds, motor driven fans to convey the air to be dehydrated, a gas heater to produce "reactivating" air, and automatic controls for continuous operation—all self-contained in a suitable housing.

Rotary Pumps for Viscous Chemicals

A complete line of specially designed rotary pumps is available from Worthington Pump & Machinery Corp., Harrison, N. J., for viscous chemicals. They are ruggedly constructed to efficiently transfer such chemicals as: sulfonated oils, fatty acids, tallows, tars, asphalts, glues, gelatins, glycerin, petrolatum, residuum, hot bottoms, mineral oils, greases, animal and vegetable oils, molasses, sugar syrups, glucose, cellulose acetates and nitrates, viscose, rayons, Cellophane and various film dopes. Pumps are available for capacities up to 700 g.p.m., pressures up to 150 lbs. per sq. in., and viscosities up to 500,000 SSU or 110,000 centipoises.

Patent for Die-Casting Machines

U. S. Patent No. 1,589,857, covering important features of modern die-casting machines using air pressure for forcing molten metal into a die supported by the machine, has just been granted to the Madison-Kipp Co., Madison, Wis.

Booklets & Catalogs

Companies whose booklets are reviewed on this page will be glad to supply readers of "Chemical Industries" with copies free, provided this magazine is mentioned and the request is made on company stationery. Your business title should also be given.

Aromatics. Catalogue No. 10, useful guide to purchase and use of aromatics, illustrated, listing all important aromatic materials produced by company, also valuable suggestions as to their applications. Givaudan-Delawanna, Inc., 80 5th ave., N. Y. City.

Automatic Boiler Regulation. Catalog No. 5001, describes system for boilers under 1000 H.P., operating at pressures up to 300 lbs. Brown Instrument Co., Wayne & Roberts aves., Phila., Pa.

Boiler Water Treatment. Booklet, 44 pp., concise summary, Fifty Years of Notable Contributions to Scientific Boiler Water Treatments in Chemical Industries. Bird-Archer Co., 122 So. Michigan ave., Chicago, Ill.

Centrifugal Pumps. Bulletin 62, for use in chemical and allied industries where acids and corrosive liquids present acute problems. Beach-Russ Co., 50 Church st., N. Y. City.

Centrifugal Water Vapor Refrigeration. Bulletin No. 9144, 32 pp., development and advantages of these installations for air conditioning and many uses in industrial and chemical plants; dimensions; typical applications illustrated. Ingersoll-Rand Co., Phillipsburg, N. J.

Chemical & Biological Laboratory Instruments. Catalog No. 38C1, information on latest developments in company's scientific instruments. American Instrument Co., 8010 Georgia ave., Silver Spring, Md.

Consolidated News. December, 1937, announces used machinery available for chemical and process industries. Consolidated Products Co., Inc., 15 Park Row Bldg., N. Y. City.

Control of Friction. Leaflet B-49, advantages of Lubriplate lubricants for controlling friction; applications, and recommendations for use. Fiske Bros. Refining Co., 129 Lockwood st., Newark, N. J.

Controlling Valves Electrically. Miniature booklet and folder describe Asco Solenoid Valves for positive automatic control of air, gas, water, light and heavy chemicals, methyl chloride, etc. Automatic Switch Co., 154 Grand st., N. Y. City.

Conveyor Belts. Bulletin, 8 pp., devoted to Monel metal and woven wire conveyor belts, illustrates typical installations, and describes various constructions available. Cambridge Wire Cloth Co., Cambridge, Md.

Corrosion. Leaflet, describes Pennpaint, prepared paint having chlorinated rubber base; useful as protective coating to resist chemical attack; unusual electrical insulating value; applications, characteristics, and fluids which can be satisfactorily handled in vessels so treated. Penn Salt Mfg. Co., 1000 Widener Bldg., Phila., Pa.

Current Publications. Booklet, 8 pp., list of current literature on production and industrial applications of nickel alloy steels, nickel cast irons, and nickel alloyed non-ferrous castings, each briefly described. International Nickel Co., 67 Wall st., N. Y. City.

Dark Field Optical Systems. Catalog D-122, scientific instruments for dark field illumination. Bausch & Lomb Optical Co., Rochester, N. Y.

Desiccator. Leaflet, describes Actigel perpetual desiccator for protecting delicate scientific instruments from moisture, rust and corrosion. Sold by City Chemical Corp., 132 W. 22d st., N. Y. City.

Dust Problem in Business. Booklet, 8 pp., stresses effective methods of dust control and immediate profit to be derived from proper suppression of dust at its source. W. W. Sly Mfg. Co., Cleveland, O.

Dutch Boy Quarterly. Vol. 15, No. 4, of interest article on Paint Film Fundamentals. National Lead Co., 111 Broadway, N. Y. City.

Exhaust Fans. Bulletin No. 1002-3, improved high speed, low power exhaust fans for use in air handling and dust collecting problems. Northern Blower Co., 6409 Barberton ave., Cleveland, O.

Flexlock Rubber Joints. Bulletin 902, 16 pp., for U. S. Stoneware acid-piping; thoroughly describes this new development in true compression flexible coupling which requires no bolts or threads to retain rubber in position. United States Stoneware Co., Akron, O.

Furnaces for Agricultural & Road Equipment. Folder, illustrations and operating data. Surface Combustion Corp., Toledo, O.

H-O-H Lighthouse. December, 1937, review of company's developments over seven years in organic chemicals, proportioning machines, and control service. D. W. Haering & Co., 3408 Monroe st., Chicago, Ill.

Insulated Steam Hose. Bulletin SH-2, lists and illustrates Rex-Weld and Rex-Tube products for use in "hot" process jobs. Chicago Metal Hose Corp., Maywood, Ill.

Laboratory and Pilot Plant Equipment. Illustrated folder gives specifications and types of pebble, ball and tube mills, mixers, kettles, autoclaves, filter presses, dry and wet pans and clay and mineral working machinery. Patterson Foundry & Machine Co., East Liverpool, O.

Laboratory Utilities. Catalog 400, a handy, condensed presentation of up-to-the-minute data on laboratory utilities. Precision Scientific Co., 1730 N. Springfield ave., Chicago, Ill.

Mathieson Chemicals. Illustrated booklet, summary of company's history, policies, resources, and facilities for rendering service; descriptions of products, package specifications, and in back, in tabular form, summary on how industry uses these products. Mathieson Alkali Works, Inc., 60 E. 42d st., N. Y. City.

Metal Oil Hose. Bulletin RT-54, "Rex-Tube," modern non-deteriorating unloading hose developed to highest point of efficiency, for all types of oil handling operations. Chicago Metal Hose Corp., Maywood, Ill.

Mixers. Bulletin 43, describes Abbe-Lenart Mixers, for rapid intensive mixing, more thorough dispersion, and more homogeneous product; specifications and applications. Abbe Engineering Co., 50 Church st., N. Y. City.

More Modern Laboratory Appliances. Catalog, 90 pp., supplement to "Modern Laboratory Appliances," presenting equipment and supplies introduced since publication of general catalog. Fisher Scientific Co., 711 Forbes st., Pittsburgh, Pa.

Multiple Recording Potentiometer Pyrometer. Folder, new development in recorders which affords maximum legibility and precision in multi-color numeral temperature records. Brown Instrument Co., Wayne & Roberts aves., Phila., Pa.

Nickel Steel Topics. December, 1937, reviews developments and fields of application in which nickel alloy steels have made important progress during the year. International Nickel Co., 67 Wall st., N. Y. City.

Packaging Equipment. Folder, Transwrap packaging machine, using either printed or unprinted Cellophane, for high speed production and low cost. Stokes & Smith Co., 4905 Summerdale ave., Phila., Pa.

Paint, Varnish, Enamel, and Lacquer Industry. Folder, partial list of synthetic and natural resins, nitrocellulose, plasticizers, ethyl lactate, driers, metallic soaps, pigments, and waxes supplied to this field, with brief descriptions. American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y. City.

Precision Lathes. Catalog No. 46, 24 pp., features, specifications and general description of all 1938 Model 9-inch "Workshop" Precision Lathes. South Bend Lathe Works, 520 Niles ave., So. Bend, Ind.

Process Industries Quarterly. Fourth Quarter, 1937, devoted to modern trends in process equipment. International Nickel Co., 67 Wall st., N. Y. City.

Progressive Perfumery & Cosmetics. December, 1937, features Vitamin Cosmetics; abstracts on research and development in this field from current literature. Van Dyk & Co., 57 Wilkinson ave., Jersey City, N. J.

Pyrometer Controllers. Bulletin 489, new line round-chart potentiometer pyrometers embodying features of close electrical control, freedom from chattering at contact points, of special interest to chemical, ceramics, rubber, plastics, and pulp industries. Bristol Co., Waterbury, Conn.

Red Squills. Booklet, 16 pp., product recommended by U. S. Dept. Agriculture for rat control; gives physiological tests, bait procedure, and formulas for use. S. B. Penick & Co., 132 Nassau st., N. Y. City.

Safe Handling of Acids and Chemicals. Illustrated folder, describes safety equipment for prevention accidents and elimination health hazards connected with handling acids and chemicals. Pulmosan Safety Equipment Corp., 176 Johnson st., Brooklyn, N. Y.

Silicate P's & Q's. December, 1937, gives abridged list of company's technical publications. Phila. Quartz Co., 121 S. 3d st., Phila., Pa.

Steam Jet Injectors. Bulletin W-205-B6, improved line of single stage steam jet injectors. Worthington Pump & Machinery Corp., Harrison, N. J.

Synthetic Organic Chemicals. December, 1937, lists thirty-one new organic chemicals added to company's stock. Eastman Kodak Co., Rochester, N. Y.

Tank Head Stamping. Catalogue, 28 pp., covers line of stamped tank heads for drums. Commercial Shearing & Stamping Co., Youngstown, O.

Tantalum Acid Proof Process Equipment. Booklet, 32 pp., story of tantalum and research conducted for its development, chemical and physical properties, several forms of tantalum heat transfer equipment, also other process equipment. Fansteel Metallurgical Corp., No. Chicago, Ill.

Textile Industry. Booklet, partial list of materials supplied to this field, *e.g.*, sulfonated oils, penetrants, softeners, sizing compounds, etc., also brief summary of uses and advantages. American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y. City.

Thermometers. Catalog No. 1125B, conveniently arranged listing of complete line of TAG industrial thermometers; pertinent information about construction and interesting illustrations of various applications. C. J. Tagliabue Mfg. Co., Park & Nostrand aves., Brooklyn, N. Y.

Thiokol Facts. Vol. 1, No. 10, contains year end review of recent applications. Thiokol Corp., Yardville, N. J.

Water Conditioning. The Betz Indicator, monthly publication available to chief engineers and other steam plant executives upon written request. W. H. & L. D. Betz, 235 W. Wyoming ave., Phila., Pa.

Zinc Alloy Die Castings. Booklet, for electrical equipment, many examples of complete assemblies shown, of interest to anyone active in development and fabrication of metal products. New Jersey Zinc Co., 160 Front st., N. Y. City.

New Chemicals for Industry

A digest of products and processes

Commercial Developments of Beidellite Clay*

Resources of Illinois

By J. Lyle Essex

Chief Engineer, Illinois Clay Products Co.

IN 1933, the Illinois Geological Survey investigated the Goose Lake clay deposits of the Illinois Clay Products Company, in Grundy County, some 65 miles southwest of Chicago. It was through this investigation that the local deposit of beidellite clay was found to exist. This vein of beidellite varies from 2 to 4 feet thick and lies beneath the overburden and between two thin veins of coal. The deposit so far as can be determined by core tests extends over a large portion of the clay bed. Beneath the beidellite deposit lie the regular fire clay horizons.

Through the petrographic analysis of this deposit, the clay was identified as a sedimentary deposit of disintegrated feldspathic rock composed of over 96 per cent. of the mineral beidellite, hence we have since used this nomenclature as a trade name for our material.

Based upon the preliminary work on the properties of beidellite, a number of commercial uses have been developed and a considerable quantity of beidellite has been mined and shipped to industries for use in

1. Reclaiming or rebonding foundry molding sands.
2. Drilling oil wells by the rotary process.
3. Cementing casing in cable and rotary oil wells.
4. Refining of petroleum distillates.
5. Refining of vegetable oils.
6. Silicate-clay adhesive for fibreboard.
7. Reclamation of newsprint paper.
8. Coating pig iron molds.
9. Emulsification of asphalts.

The particular properties of the clay that make it useful in each one of these industrial processes are discussed and the manner in which beidellite fulfills these requirements is also given.

The modern high-production foundry would require an enormous volume of sand for one day's operation, if it were not for the rebonding practice. With a synthetic sand, a greater economy of operation can be effected because the cost of the base sand is usually much less than that of a naturally-bonded molding sand. With the introduction of bond clay, almost any type of sand can be manufactured in the foundry.

The selection of the proper type of bond clay is of the utmost importance in most sand work since green strength, dry strength and permeability must be properly controlled and the durability of the bond directly affects the life of the sand. Most fire clays will bond sand satisfactorily if the requirements are not too rigid, but the objections to using fire clay are that the large volume required to obtain desired strength reduces the permeability and causes the mold to produce scabbed castings. The desire of the foundryman is to use a clay that will give the desired strength with the least amount. Of such clays, beidellite is especially suitable.

Beidellite is highly plastic, very refractory, has a sintering point of 2100° F. and a fusion point of 2550° F. It possesses the required fineness and colloidal structure to spread evenly over the sand grains and it has the affinity for water that allows it to develop its bonding power rather quickly.

Beidellite in Drilling Oil Wells: This particular industrial application is of prime importance today in the State of Illinois due to the recent impetus given to oil production in the southern Illinois oil fields. It is a case where one Illinois mineral resource is aiding in the recovery of another mineral resource.

Generally speaking, any drilling mud fluid to be used for rotary drilling may be regarded as a three component system as follows:

1. Water as suspending medium.
2. Colloidal matter consisting of both gel-forming and non gel-forming types.
3. Larger inert particles.

The gel-forming type of colloid is definitely the more important, for this group imparts the necessary properties to an efficient mud fluid, such as: stability of suspension, viscosity, pore-sealing and gel characteristics in general. Colloids of the non-gel-forming type, together with the inerts, contribute somewhat to the viscosity but more particularly to the density of the mud.

The Bureau of Mines terms a mud fluid as a mixture of water with a clayey material which will remain in suspension for a considerable length of time and is free from sand, lime cuttings or similar materials. It is obvious, therefore, that the most economical means of making a mud fluid is to add a clayey substance to water and mix thoroughly until the desired consistency is obtained. The common clays that are best suited for the preparation of mud fluids are hydrous aluminum silicates containing the necessary quantity of colloidal matter.

Beidellite was found to possess an ideal balance of gel-forming colloids, non gel-forming colloids and inerts to make it a satisfactory drilling mud.

Cementing and Mudding Oil Wells

The customary procedure in all oil fields is to set casing of various diameters. In most cases it is the 5" casing that is left in the well, providing it is a producer. In the event that a dry hole is obtained, the driller is then obliged to pull all of the casing he has put in and to plug the hole. If these various strings of casing are cemented with Portland cement it is practically impossible to pull the pipe, so that the driller now prefers and is allowed by law to set the casing temporarily with a heavy mud.

Since beidellite can be made into a plastic mud its use in the mudding of casing has been quite extensive, especially in

* *Abstract of address presented October 8, 1937 at the Fifth Annual Illinois Mineral Industries Conference, Urbana, Illinois.*

the Michigan field where 60 sacks of beidellite or 80 sacks of Goose Lake fire clay are used per well.

The valuation of any particular clay for efficacy in bleaching industries involves the determination of certain physical properties of the clay such as dehydration rate, apparent density or volume weight, apparent acidity, porosity, plasticity, spontaneous combustion, decolorizing power, oil-retention capacity and oxidizing power.

Although Goose Lake beidellite does not contain the mineral montmorillonite, it seemed to possess many of the properties pertinent to Fuller's earths that its evaluation for this type of use was determined.

Refining Edible Oils

Due to the close proximity of Goose Lake clay deposits to the packing industry which is centered in Chicago, Cleveland, Cincinnati and Milwaukee, tests were made on the efficacy of beidellite for treating vegetable oils, particularly cotton seed and soya bean oils.

Some previous tests made by Dr. P. G. Nutting of the U. S. Geological Survey, Washington, D. C., on beidellite also showed that it was adaptable to the bleaching of vegetable and animal oils. Laboratory tests by Swift and Armour, however, have never justified the switch from Bennett-Clark clay to beidellite although considerable monetary saving should be shown by making such a change.

Silicate-Clay Adhesives

Some time ago the Philadelphia Quartz Company published a comparison of the properties of straight silicate and silicate-clay adhesives in the fibreboard manufacture.

Since beidellite could be finely ground, had a low moisture, lime and iron content, had an ignition loss of less than 14 per cent. and was composed of aluminum silicate, its use in silicate-clay adhesive seemed justified. Of over 100 clays tested, beidellite was one of three that possessed the required properties.

Silicate-clay adhesive is now sold in tank car lots under the trade name of "Stixso." The product is mixed at the silicate plant where uniform conditions are maintained.

De-Inking Newsprint

The process used in de-inking newspapers, which was developed by the Forest Products Laboratory, Madison, Wisconsin, consists of cutting the varnish vehicle of the ink by heating the old newspapers with a caustic solution at a temperature low enough that the paper stock is not discolored, adding beidellite to peptize the carbon black, and washing with water so that the carbon is washed through and the pulp is retained on the screen.

Coating Pig-Iron Moulds

In the Heyl-Patterson moulding system used by the majority of steel mills for moulding iron into pigs, the moulds are sprayed on their return trip to the pouring ladle with a slurry of milk of lime or dolomite. This dries rapidly and leaves a thin coating of chemical on the face of the mould, thus preventing sticking of the molten iron and quick release of the chilled pig. The replacement of the lime or dolomite wash with a mixture of Goose Lake fire clay and beidellite was found to be highly satisfactory and even better than a silicated fire clay.

Emulsifying Oils

While very little has been done in our laboratories on the application of beidellite as an aid to emulsification of oil in water, we are informed by two emulsion manufacturers that it can be used in place of bentonite for emulsifying asphaltic materials. Since the quantity of clay used amounts to only 2/3 per cent. of the weight of the emulsion, the consumption of clay in this industry would perhaps be low.

While the application of beidellite to the many uses stipulated below has not been actually investigated it is quite possible that beidellite can be used wherever bentonite is stipulated in:

1. Paper, oil cloth, curtain cloth, linoleum or cordage, as a filler and retentioner for China clay.
2. Rubber compounding, as a filler.
3. Enamels, for suspension of frit.
4. Portland cement, for increasing strength and retardation of setting time.
5. Road building, as binder for stone.
6. Putty, for adsorption of linseed oil.
7. Phonograph records and electrical insulation, as filler.
8. Pencils, leads, crayons and pastel colors, as wetting agent.
9. Plasters, as retarders.
10. Paste, glue, or size, as adhesive spreader.
11. Sprays and insecticides, as emulsifier.
12. Cold water paints, calcimines, printers inks, as peptizing agent.
13. Roofing and waterproofing preparations, as emulsifier of tars, asphalts and pitches.
14. Coal mines, as dust layer.
15. Water purification, as softener.
16. Molasses industry in form of calcium beidellite, to remove potassium from sugar solutions.
17. Medicament, as base for anti-phlogistine or salves.

The tonnage consumed in many of the above uses would amount to considerable while in others it would not amount to much, nevertheless it is obvious that the outlets for a clay, possessing the properties that beidellite does, seem to be unlimited.

Salt from Sea-water by Freezing

Extraction of common salt from sea-water by a new freezing process is being tested out in an experimental plant near Gullmarsfiord, on the west coast, by the Svinska Turbinfabriks A.-B., of Finspang, Sweden. From *Chemical Age*, Dec. 4, '37, p. 451.

Solid Aluminum Formate

A solid form of aluminum formate, finding increasing application in the textile and other industries, is described by Dr. T. Hennig in the *Chemiker-Zeitung*, Nov. 27, abstracted in *Chemical Trade Journal*, Dec. 3, '37, p. 500. The material is described as aluminum triformate, containing three molecules of water of crystallization. It crystallizes especially well from acid solutions of aluminum formate of high concentration. When the preparation is conducted on a laboratory scale, the results are not too good owing to the incomplete separation of the salt and its retentive absorption of mother liquor. On the large scale, however, the separation of the salt is better and the yields are higher.

Product is a white, finely crystalline powder which has thixotropic properties when damp. At normal temperatures and under average humidity conditions it is quite stable. It is only slightly soluble in cold water, but very soluble in hot. At 20° C. a litre of water will dissolve about 50 grammes of the crystallized salt, while a litre of boiling water will dissolve up to 500 grammes. In making solutions for technical purposes, a water temperature of from 70° to 100° C. is best. Agitation should be continuously maintained during the dissolving process. Solutions for technical purposes are stabilized by the addition of a small quantity of aluminum hydroxide or calcium carbonate.

The practical application of aluminum formate is due mainly to the fact that its acid content is harmless both to textile fibres and to furs. A further property is its ease of conversion into the basic insoluble formate by the drying of all aluminum formate solutions. This basic salt is only difficultly wettable by water. Textiles so treated can consequently be made water resistant, while paper can be sized. At present, aluminum formate is being used principally for the impregnation of textiles, for which purpose the advantages possessed by the solid aluminum triformate are that its solutions are less sensitive to bases and consequently to the hardness of the water used than the ordinary aluminum formate solutions. Further, the triformate solutions are applicable hot, a point of advantage in the treatment of thick or closely-woven textiles. It is also employed as a mordant in the textile and fur industries, for the delustering of artificial silk, the after-treatment of dyeings, and for many other industrial purposes.

Research in the Mineral Industries*

By Clyde E. Williams

Director, Battelle Memorial Institute

THERE are many types of research and many methods for classifying it. In the case of the mineral industry, two broad classifications may be made, namely, (1) research into methods of discovery, mining, preparation and smelting of minerals, and (2) use research, which may take the form of increasing old uses in established industries, substituting one product for another or developing entirely new uses. Research also may be broadly classified as fundamental and practical. Fundamental research consists in finding facts that may or may not have a practical application, while practical research consists in the application of fundamental knowledge to effect a useful result.

I believe that research supported by state and federal agencies should consist largely of the fundamental and pioneering type, leaving it to the industries to carry on the practical type of investigations.

The most basic of all minerals perhaps is coal, and the State of Illinois is blessed with large reserves of this valuable resource. Great advancement in the cleaning of coal has been made in recent years, and great possibilities for further improvement lie immediately ahead. The extraction of pyrite from coal is now economically feasible in some fields. Widespread use of this practice will provide an important return to those operating properties that contain important contents of this valuable by-product.

Illinois coal has excellent combustion characteristics and is especially suitable for combustion on small underfeed stokers. Research is resulting in the development of domestic stokers that will increase the value of this coal in relation to other forms of fuel. Some day, it is hoped, research will develop methods by which this coal can be used for the reduction of iron ores. The development of a cheap and effective method of briquetting fines will bring a larger return per ton of coal mined.

Until recent years, the use of coal as a chemical raw material has been largely overlooked. Now the great chemical companies are producing, almost by magic, such wonderful products as synthetic plastics and rubber using coal as a basic raw material.

The next revolutionary method for using coal for the generation of heat undoubtedly will be as gas, either generated at the mine and transmitted to centers of consumption in pipe line, or generated at large centers of consumption and piped in existing transmission lines to the user. The next step will be the liquefaction of coal and the use of the resultant oil for the same general purposes that petroleum is now used. The rate of discovery of oil is now less than the rate of production. As a result, oil will become more valuable, and the essential uses to which it is now put, that is, in gasoline and lubricating oil, will require that more and more of the raw oil be converted into these commodities. As this requirement increases, less oil will be available as a fuel for competition with coal.

The development of the automobile, which was handed to the oil industry at no expense, caused a phenomenal increase in the output of petroleum in this country to about one billion barrels last year. We must give the oil industry credit, however, that once having been given a good thing, it made the most of it by speedily making developments in the production of gasoline and lubricants, so effectively, that without it the automobile industry could never have reached its present state of development.

For the iron blast furnace, the open-hearth steel furnace, cupola, and other metallurgical operations, limestone or lime is the flux par excellence. Likewise, in mortars used in the building industry, lime is almost without a rival. For these uses research into better methods of preparation and improvement of the desired qualities of the product for a given use will continue. Lime also enters into many chemical manufacturing operations and as new products are developed, will find an increasing use.

The mineral wool industry may prove a boon to limestone just as the development of the automobile changed the aspect of the oil industry. It is highly probable that this industry may soon account for an important percentage of the limestone output of this State, and as a further advantage to the industry, a lower grade stone may be advantageously used. The Illinois Geological Survey has done a very creditable piece of research work in this field.

"Ottawa" silica sand enjoys a wide market in the foundry, both as a molding sand and as a sand blasting material. Its high purity also makes it desirable as the major constituent in the furnace mixture for making glass, and its physical properties make it an excellent agent for the polishing of glass. Developments in the glass industry are coming fast, new uses, as a result of research work, bid fair to increase the output of glass to an enormous degree. Your silica resources will be an important factor in making these developments possible, and not only will the mineral industry profit, but industrial activity within the State will be increased by the further building up of the glass industry.

Improved methods of preparation and especially of purification to bring this material to an even more desirable form undoubtedly will be developed through intelligent research.

The steel industry is fortunate in that the valuable flux, fluorspar, occurs in the State of Illinois so near to many steel-making operations. Fluorspar manufacturers in this State have done fine work in producing by modern cleaning methods an excellent grade of fluorspar. Producers, however, should be ever watchful that substitute materials may not be proved to be more useful than fluorspar, and should strive through research to improve the quality of the product, decrease its cost and demonstrate its utility. Fluorspar also is used in lead refining and in the chemical industry. It is a useful reagent that deserves the attention of research workers.

Clay and products made from it enjoy a multitude of uses. The iron and steel industry is an ever hungry customer. Research has it in its power to improve the refractoriness and the workability of clay so that clays once considered unsuitable for refractories, pottery, and other uses might be economically converted into products satisfactory for these purposes. Light-weight refractories made from clay by the incorporation of pores within the body are being rapidly developed and found advantageous in increasing the efficiency of metallurgical and other heat-generating furnaces. The use of light-weight aggregates in cement construction for decreasing the weight of structures is rapidly coming to the fore. Clay, made hard and porous by various methods, thus has a new and large market opened up for it. The general use of light-weight brick for building construction has not yet arrived in this country, but when it does arrive and costs of construction are consequently lowered, more structures will be built, and an increased market for clay will be made available. For this reason, research into development of light-weight units from clay should be fostered.

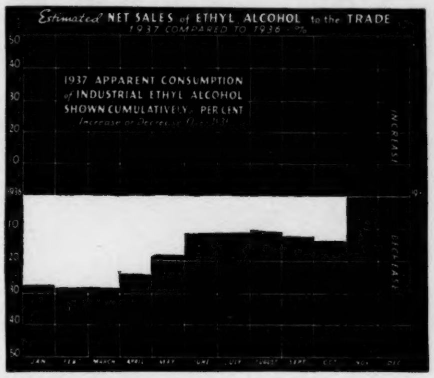
** Abstract of address presented October 8, 1937 at the Fifth Annual Illinois Mineral Industries Conference, Urbana, Illinois.*

Prepared Monthly by the U. S. Industrial Chemical Co., Inc.

SOLVENT NEWS

Reg. U. S. Pat. Off.

JANUARY ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1938



Apparent consumption of industrial ethyl alcohol from Jan. 1 to Oct. 31, 1937, was 49,742,000 wine gallons. This is 12.4 per cent less than during the same period in 1936 when 56,741,000 wine gallons were consumed.

Makes Tacky Adhesive By Mixing Solutions of Rubber and Ester Gum

WASHINGTON, D. C.—Combining a solution of rubber with a solution of ester gum will produce an adhesive characterized by "permanent tackiness," according to a recent patent granted here.

If applied to one surface, the adhesive will join two surfaces in an essentially "permanent" bond which can be broken apart later without damaging or marring the surfaces, the inventor claims.

Typical formulations for the two solutions are cited by the patent as follows:

Solution 1

Milled crepe rubber	1 lb.
Naphtha	2½ gals.

Solution 2

Ester gum	4 lbs.
Toluol	25.6 ozs.
Ethyl Acetate	19.2 ozs.
Butyl Acetate	6.4 ozs.

To obtain an adhesive with the proper tackiness, the inventor adds preferably 5 to 15 ounces of the ester gum solution to sufficient rubber solution to make a total yield of about 1 gallon.

The resultant product can be used "for joining together in all combinations paper, cardboard, glass, wood, cork, metals, fabrics, cellophane, etc." Upon separation of any joined surfaces, all of the adhesive remains on the surface to which it was originally applied, the patentee asserts.

Simplify Paint & Varnish Containers and Shades

"Consistent educational effort" toward familiarizing the industry and the consumer with the simplification program relating to shades and containers for paints, varnishes, and related products is urged upon all manufacturers by the joint committee on Simplified Practice Recommendation R 144-37 in a recent bulletin issued by the Dep't. of Commerce.

The bulletin outlines revisions and additions to the original schedule accepted by the industry and lists over 600 organizations now cooperating.

The committee stresses the value of previous work and asks for suggestions "to keep it abreast of current conditions."

Explains How To Figure Paint and Varnish Cost

Speaking at the Industrial Sales Session of the National Paint, Varnish and Lacquer Assn. in Cincinnati, Wm. R. Sieplein, general supervisor of costs, The Sherwin-Williams Co., presented a cost system for paint and varnish manufacturers that is winning the acclaim of experts.

Mr. Sieplein reports that after the NRA was outlawed, much of the improvement brought about by the Cost Committee of the Code Authority was dissipated. Starting with the work of this and other committees, the author has developed a cost system which "clearly and simply outlines the fundamental principles."

Using many tables and charts, this expert cost accountant shows how to calculate the cost of raw materials, handling, manufacturing, labor, overhead, the formula yield and other factors which determine the final selling price.

Believing that many Solvent News readers would like to have copies of Mr. Sieplein's article, arrangements have been made to publish a comprehensive digest of it in the 4-page Solvent News folders mailed without charge to subscribers. To receive your copies, simply write to U.S.I. and ask that your name be added to the Solvent News mailing list.

Silicon Carbide in Paints

Chemical resisting paint in which finely ground silicon carbide is added to the usual pigments was recently patented in England. The silicon carbide acts as a pigment and as a chemical resisting admixture, it is said. Titanium oxide can also be used, and small amounts of chrome pigments increase the rust-resisting properties, the patentee reports. Examples are given in which 85 parts of silicon carbide are added to 15 parts of litharge or red lead, or 85-75 parts of carbide to 15-25 parts of white lead.

Complete specifications, applications, commercial data and technical information on all the products of the U.S. Industrial Chemical Co., Inc., are given in the new catalog, "Solvents and Chemicals." Copies may be secured by writing to U.S.I. on your business letterhead and asking for a copy of the "Solvents and Chemicals" catalog.

Find Ansol M Best Solvent in Resin Viscosities Study

Develop Table for Manila Resin-Alcohol Solutions

BROOKLYN, N. Y.—Further evidence of the superiority of Ansol M as a resin solvent is contained in a report of a new series of tests on resin viscosities just completed in the laboratories of the American Gum Importers Association, Inc.

Twenty-eight grades of Manila were tested for their color, viscosity and solubility in various alcohols and denatured alcohol solvents. In every case Ansol M* showed the greatest solvent power and gave Manila resin solutions of lower viscosities than any denatured alcohol or alcohol-type solvent studied.

As a result of the tests resin consumers, it is pointed out, are for the first time able to prepare a Manila resin-alcohol solution of a given definite viscosity by consulting tables which show the viscosity of the resin in solvent.

Pontianak Resin

At the same time, it is stated, the tables enable selection of the most satisfactory resin for a given viscosity on the basis of the viscosity ratings applied to each class of resin.

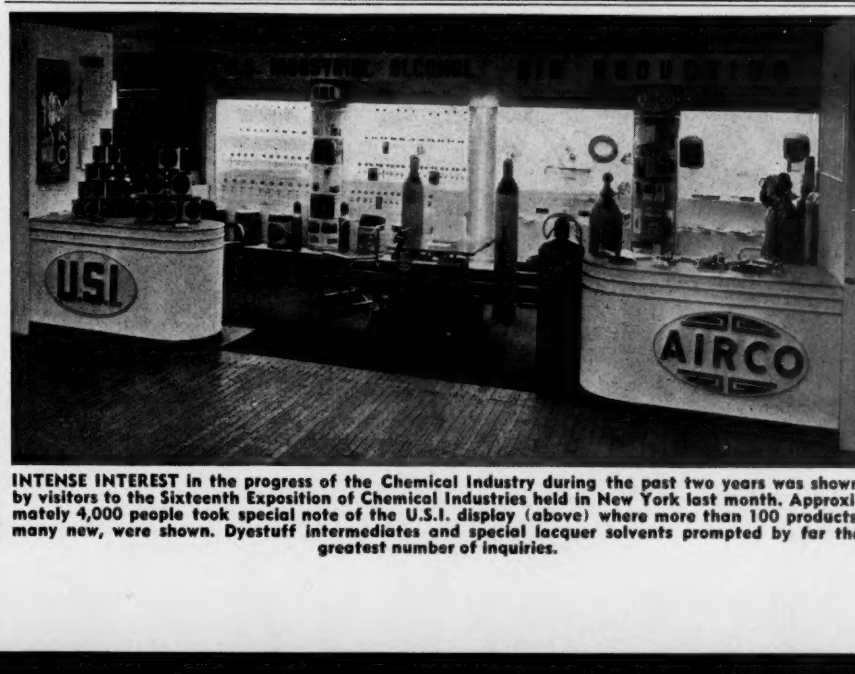
A simplified form of viscosity table for Pontianak resin follows:

Grade	Ansol M*	Solox†	C.D. Alcohol No. 12
Bold scraped	L	R	X
Mixed Bold	E	F	Q
Cuttings	I	J	O
Nubs	G	I	L
Chips	D	D	F

The viscosities shown are Gardner-Holt viscometer readings in which viscosity is designated by letters. A indicates the least viscous solution; B one slightly more viscous, and so on.

As will be noted, an Ansol M* solution of Chips is the least viscous, while a C.D.

(Continued on next page)



INTENSE INTEREST in the progress of the Chemical Industry during the past two years was shown by visitors to the Sixteenth Exposition of Chemical Industries held in New York last month. Approximately 4,000 people took special note of the U.S.I. display (above) where more than 100 products, many new, were shown. Dyestuff intermediates and special lacquer solvents prompted by far the greatest number of inquiries.

JANUARY ★ **SOLVENT NEWS** ★ 1938

Stabilize Lacquer With Formaldehyde Solution

LONDON, England—How to stabilize in the can, lacquers of the urea formaldehyde and phenol formaldehyde type that harden by polymerization, is revealed in a recent patent granted here.

The inventor uses free formaldehyde—conveniently added to the lacquer in a solution of butyl alcohol.

A typical formulation outlined in the patent papers is as follows: To a 50 per cent solution of urea formaldehyde resin in butyl alcohol (40 parts) is added 2½ parts of paraformaldehyde dissolved in 5 parts of butyl alcohol (which may also contain the hardening catalyst) with the aid of a trace of alkali and 0.1 per cent of 30 per cent hydrochloric acid.

When so treated, the resultant lacquer, it is claimed, will dry to a hard, insoluble film in one to two hours.

Chloroprene in '38 cars

Chloroprene rubber is being used for one or more purposes on most of the 1938 automobiles, according to "Automotive Industries." Among the applications reported are water pump seals, radiator cap gaskets, gear shift bumpers, dust and oil seals and as a bumper in the front wheel lower spring seat. The latter application utilizes both the vibration-dampening and oil-resisting properties of the synthetic rubber.

Metallic Soap Retards Chalking of Paint Film

LONDON, England—Failure of paint film by chalking is noticeably delayed by compounding with certain metallic soaps, according to a new series of tests reported here. The soaps used, tin oleate, tin resinate and chromium oleate, were found to have a double action: delaying the onset of chalking and retarding it if already begun. An increase in the interval preceding chalking of 50 to 100 per cent was noted when a solution of chromium oleate in petroleum spirit was used. Since paints containing titanium dioxide were used in the tests, the experimenters believe that other paints will also respond to the treatment.

Tobacco Treatment

LONDON, England—Treatment of tobacco leaves with ethylene gas to reduce curing time and improve flavor and aroma has been suggested by the Agricultural Adviser to the Colonial Office. Ethylene gas stimulates the enzyme action in the curing of tobacco, it is claimed.

Sucrose octa-acetate can be used for waterproofing textiles and for insulating paper and plaster substances, according to a recent article. The salt is dissolved in a suitable solvent and applied to the surface of textiles. Ironing is said to produce a completely waterproof gloss.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A sprayable corrosion-resistant plastic has been developed to delay the damage to concrete, steel and wooden structures and equipment by corrosion, erosion, electrolysis, etc. According to the manufacturer, the material bonds to the base material and can be pigmented to practically any color or shade. **(No. 51)**

U S I

A new heat-resisting aluminum finish will withstand temperatures up to 1900 deg. F. without discoloration, blistering, etc., the manufacturer states. The material can be held over an open flame a few minutes after applying by brush or spray, it is claimed. **(No. 52)**

U S I

Combination sheet aluminum and wood veneer is now available for wall covering, paneling, etc. According to the manufacturer the aluminum gives light weight, fire-prevention and flexibility; the thin veneer of wood gives the beauty of natural grain in the color and texture desired. **(No. 53)**

U S I

Loss of drying of paints on aging is said practically to be eliminated by incorporating a small amount of a new product in the pigment before it is ground. **(No. 54)**

U S I

A dispersion of carbon black in shellac has been placed on the market. It is said to simplify the incorporation of carbon black into products where shellac is used. Reported composition is: shellac, 62½%, carbon black, 37½%. **(No. 55)**

U S I

A waterproofing agent for animal, vegetable and artificial fibers which is said to give a soft feel to the waterproofed fabric is now on the market. **(No. 56)**

U S I

Calcium stearate beads for waterproofing cement can be made more economically by a new process, according to a recent announcement. Other advantages claimed for the process are: Increased calcium stearate content (95.1 per cent), easier and more uniform dispersion with cement, and no dust from the beads. **(No. 57)**

U S I

A rust preventive compound which can be dipped, sprayed or brushed on metal surfaces to produce thin, transparent, colorless and corrosion-resisting films is now being marketed. According to the announcement, the films can be varied in texture, depending on the service desired. **(No. 58)**

U S I

Perfection of a new-type "freeze-proof" carbon paper, announced recently, is expected to overcome the reported "freezing" of carbon paper in the sales books of truck drivers, house-to-house canvassers and others operating out of doors during the winter. **(No. 59)**

Ansol M Wins Top Rating in Study of Resin Viscosities by Gum Ass'n

(Continued from previous page)

Alcohol No. 12 solution of Bold Scraped is the most viscous.

Experimental work has shown, when the range of materials covers all the commercial grades of Manilla Copal resins "that the superior solvent power of Ansol M* is maintained throughout."

The report further states:

"The superiority of Ansol M* as a solvent may be attributed to two factors:

"1. Ansol M* is . . . anhydrous . . . i.e., there is no water present. [Ansol M is substantially anhydrous denatured alcohol to which have been added percentages of ester and hydrocarbons—Ed.]

"2. The possibility of one of the denaturants in the Ansol M* being an excellent solvent for Manilas."

The tests were made by grinding the resin to split pea size or smaller, placing a 100 gram sample in a narrow screw cap jar and adding to this 100 grams of solvent. The jar was then rotated end over end, at about 30 R.P.M. for 15 to 18 hours at room temperature, after which it was allowed to stand for 24 hours. Color, viscosity and solubility determinations followed.

Among the Philippine and Pontianak resins examined, the best grade in each case gave the greatest viscosity. However, among the Lobas, Loba "A" gave a lower viscosity than Lobas "B," "C" and "D."

The Manilla Copals embrace those known as soft Manillas or Melengket, the half hard Lobas, the Pontianaks and the Boeas.

*Trade-mark registered by U.S. Industrial Chemical Co., Inc.
†U.S.I. proprietary solvent.

Illinois ranks as one of the largest producers of Portland cement in the United States. The industry is constantly improving its products, making faster setting and stronger cement as well as opening up new uses for this remarkable material. Many opportunities exist for additional developments.

The Illinois operators in the mineral industry have done an excellent job in making available the rich natural resources of this State to the industries of the State and the nation. Continued growth of these manufacturing industries will insure a healthful life for the mineral producing industries. Since our modern industrial life has made business a competition of initiative and resourcefulness, I beseech you to continue and even to increase your support of the fundamental and pioneering types of research that are the life blood of your great industry.

Methyloctanes in Crude Oil

Isolation of the three methyloctanes from petroleum has been accomplished for the first time by Joseph D. White and Augustus R. Glasgow, Chemistry Division, U. S. National Bureau Standards. The methyloctanes were found closely associated with naphthenic hydrocarbons in the fraction of Oklahoma petroleum which distilled between 142° and 145° C., after the aromatic hydrocarbons had been removed. Together they constitute about 0.3 per cent. of the crude, the 2-, 3- and 4-methyloctane being present in the proportions of 3, 1 and 1.

In all, the methyloctane fraction contained not less than seven compounds, which were separated by physical means. *o*-Xylene was extracted with liquid sulfur dioxide and silica gel, the naphthenes were removed by distillation either at reduced pressure or with admixture of glacial acetic acid The residual paraffinic fraction yielded, at once, 2-methyloctane on crystallization from solvent dichlorodifluoromethane. Redistillation of the mother liquid produced concentrates of the 3- and 4-methyloctane which, because of their high viscosity when cooled, had to be crystallized from solvent methane, a liquid with very low viscosity, in order to separate them in a nearly pure condition.

Thus far, five of the 35 isomeric hydrocarbons having the formula C_9H_{20} have been isolated from the petroleum, namely, the three methyloctanes, *n*-nonane boiling at 150.7° C., and 2, 6-dimethylheptane boiling at 135.2° C. The October number of the *Journal of Research* contains the official report of this work.

Colorless Moldings from Chlorinated Rubber

Discussing recent, hitherto unpublished, work on the chlorinated rubbers, carried out at the National Chemical Laboratory, Sir Gilbert T. Morgan, at the annual meeting of the Institute, held in London recently, said that transparent, almost colorless, sheets of Alloprene (the chlorinated rubber made by I.C.I.) can be produced by dissolving this product in benzene or carbon tetrachloride and allowing the volatile solvent to evaporate. The material unites with basic coloring matters in a remarkable manner. The most striking property of Alloprene is that it can be used as a plastic without the addition of any filler. When compacted in a mold under pressure of one ton per square inch at 115-120° C. an opaque molding is produced when the pressure is released immediately at the high temperature. If, however, pressure is retained while the mold is cooled to approximately 70° C., then a completely transparent molding is obtained. The color of these transparent moldings is determined by the character of the original rubber before chlorination. For instance, oxidized or degraded rubbers yield moldings of the chlorinated derivatives which are colored brown or yellow. With deproteinized rubber, however, from which the less stable resinous and albuminoid constituents are absent, transparent almost colorless moldings are obtained. Progressive improvement of the starting material as regards the removal of color and suspended impurities may soon place this plastic product within the category of colorless organic glasses. *Chemical Trade Journal,* Nov. 19, '37, p. 458.

Foam Prevention in Casein Manufacture

In the manufacture of low-foaming, acid-precipitated casein, the addition of diglycol laurate to the milk materially reduces the foam index of the finished casein. Diglycol laurate is not strained off with the whey, nor does it volatilize under the conditions of drying the casein. It is not absolutely necessary to add it to the milk. If desired it can be added to the casein directly. In this case it has been found that less than one-tenth of one per cent. reduces the foam index considerably, in many cases to zero. *British Plastics and Moulded Products Trader,* Nov. '37, p. 281.

Dewaxing Solvent

The suggestion that methyl normal-butyl ketone should find wide application as a solvent for dewaxing purposes was made by O. S. Pokorny and R. K. Stratford in a paper to a meeting of the Institution of Petroleum Technologists in London recently and noted in *Chemical Trade Journal,* Dec. 3, '37, p. 506. From the viewpoint of wax solubility, miscibility temperature with oil, filter rates and cold test-dewaxing temperature relationship, methyl *n*-butyl ketone behaves in an excellent manner, said the authors. Its vapor pressure is such as to render recovery a comparatively simple matter without entailing large evaporation losses. It is stable and non-corrosive under distillation conditions; it is non-toxic, and, due to its characteristic smell, its presence can be noted long before the concentration reaches the lower explosive limit, making it a safe solvent.

Month's New Dyes

New General Dyestuff releases include: Acid Violet 5BL, product of I.G., which, dyed from a Glauber's salt-sulfuric acid bath, produces on wool bright violet shades of improved fastness to light, etc. It is also recommended for silk and on wool-silk unions produces uniform shades. Supramine Red BLL is distinguished from the Supramine series by an improvement in fastness to light over the older brands, and is of special interest to the knitting trade. It dyes level from an acetic acid bath and produces bright reds. Effects of cotton, rayon and acetate are left perfectly clean. Rapidogen Golden Yellow IFG produces very desirable, bright shades which so far could not be printed with Rapidogen colors. Diazo Brilliant Scarlet 5BLN Extra when diazotized and developed with Developer A produces clear bluish red shades on cotton or rayon of very good dischargeability with both neutral and alkaline discharge pastes. Product is recommended for machine dyeing. Fastusol Turquoise Blue LG is a direct dyestuff of remarkable brightness and excellent fastness to light. Its bright green blue shades possess a purity which so far was not even obtainable with the clearest basic dyestuffs. It is well suited for self and combination shades, particularly for extremely bright greens.

Four new dyestuffs have been announced by du Pont: Pontamine Fast Brown SKRL is a bright, reddish brown, of a slightly more yellow cast that the Pontamine Fast Brown RKL, which it augments. It is designed for hosiery dyeing as well as for use as a union color. Lithosol Red 2B Powder, announced as a calcium lake, or toner, was developed for use in printing ink and lacquers when a bright, bluish-red coloring medium of good resistance is required. It has demonstrated suitable fastness to acid, alkali, lacquer solvents and light, and is non-bleeding in oil, water and alcohol. Tests show it to withstand change when baked at 275°. Two new Ponsol vat colors have been added: Ponsol Dark Brown R Paste to be used chiefly as a base for dark brown shades on dress goods, shirtings, towelings and similar cotton and rayon materials and Pensol Brilliant Red B Paste to be used in providing fast colors on cotton, rayon and linen in all forms. It produces bright yellowish shades of red.

Utilization Pyrites Residues

A method for the utilization of burnt pyrites residues has been patented by Hungaria Artificial Fertiliser & Chemical Co., Budapest. Process involves briquetting the material, after removal of all non-ferrous metals, with a carbohydrate binder and subsequent treatment at a moderately high temperature. Briquettes produced are stated to be hard enough to be satisfactorily employed in blast-furnace operation.

Plastics from Potato Flour

In the *Chemical Digest* of Foster D. Snell, Inc., Vol. 3, No. 2, it is stated that the latest transparent plastic is made largely from potato flour.

Uses for Cyclohexylamine

Cyclohexylamine, dicyclohexylamine and their derivatives are finding applications in organic synthesis, as insecticides, plasticizers, corrosion inhibitors, rubber chemicals, dyestuffs, emulsifying agents, dry cleaning soaps, acid gas absorbents and for a variety of miscellaneous uses. They were described for the first time in 1893 and are now being produced commercially for the first time in the United States according to *Canadian Chemistry & Metallurgy,* Nov. '37, p. 372.

Ammonium Sulfate in Bauxite Treatment

Principle of a method for working bauxite or the so-called "red silt" remaining from the Bayer method is a treatment with ammonium sulfate. Hungarian Patent 116,729, mentioned in the *News Edition, I. & E. Ch.*, Vol. 15, No. 22, p. 495, states the metal sulfates can then be dissolved in a slightly acid solution. Ammonium sulfate is once more added to the filtrate to crystallize aluminum in the form of ammonium-aluminum sulfate. The remaining mother lye is reduced by sulfur dioxide and iron is removed by adding ammonium sulfate as crystalline ferro-ammonium sulfate. The second mother lye is treated with ammonia to precipitate the various metals as hydroxides, which can be separated by fractional washing out with various chemicals—carbon dioxide, ammonia, sulfur dioxide, ammonium salts, etc. The ammonium-aluminum sulfate obtained can be converted to oxide or hydroxide by dissolving it in ammonium carbonate and heating or boiling the basic salt formed.

To Rid Ships of Vermin

Dry ice is being used with ethylene oxide to kill all vermin on shipboard without the dangers of cyanide fumigation, according to the *Chemical Digest* of Foster D. Snell, Inc., Vol. 3, No. 2.

Thermoplastic Material

A highly elastic, thermoplastic material, with exceptionally good physical and electrical properties, known as Oppanol B, has been introduced abroad. Described as being a "synthetic rubber type compound," new material has been made available in two grades, Oppanol B 100 and Oppanol B 200, the molecular weight of the first being 100,000 and the second 200,000. It can be extruded at high speed on to wires at a temperature of approximately 225° C. and maintains its elasticity within a temperature range of —50° C. to over 100° C.

Oppanol B is described as being non-hygroscopic, resistant to dilute and most concentrated acids and alkalis (with the exception of concentrated nitric acid which affects it slightly), and unaffected by methanol, butanol and acetone, but liable to swell in ether and butyl acetate. It is resistant to ozone and is soluble in benzine, benzol, mineral oil and carbon disulfide. Its electrical properties are said to be unaltered after 24 hours' immersion in water. *The Rubber Age,* Dec. '37, p. 186.

Waste Paper to Industrial Use

The old method of Gusztáz Bernáth, Hungarian Patent 116,521, makes possible the industrial use of waste paper, and is mentioned in *News Edition, I. & E. Ch.,* Vol. 15, No. 22, p. 495. Old newspaper must be rubbed mechanically with a mixture consisting of an oil solvent neutralized by a soap and of glass flour or quartz sand. The printers' dye is thus removed from the paper and after filtration can be used again. The extracted paper is also available in paper mills.

Onion Flour to Replace Onions

Use of onion flour to replace fresh onions with a product of high quality is suggested in Hungarian Patent 116,541. The onion flour is mixed with a binding material, e.g., gelatin, to a thick pulp. Then salt, fat, palm grease, or tallow is added to facilitate the solution of the product in water. Eventually, castor oil can also be used to prevent the formation of cracks during drying and storage. Product can be sold in the form of balls, cubes, or lumps. From the *News Edition, I. & E. Ch.,* Vol. 15, No. 22, p. 495.

New Rubber Product

Made under the Rubatex process, Cell-Tite, a new rubber product, has been developed by the Sponge Rubber Products Co., Derby, Conn. It is described as being soft, moisture-proof and buoyant, with each cubic inch made up of "thousands of rubber-encased, nitrogen-filled bubbles." It is also said to be long lasting, since oxygen cannot reach its inner structure; light in weight, the only weight being that of the rubber comprising the cell walls; soft and resilient, due to the rubber itself plus the nitrogen-filled cells; vermin-proof; water-proof; a good insulator; and an excellent vibration dampener. It may be used in refrigeration on ships, trucks, railway cars, ice cream and dairy plants, and for dry ice blankets. For general marine use it may be used for boat fenders, bumpers, mooring buoys and for all types of standard life preservers. *The Rubber Age,* Dec. '37, p. 186.

Low Loss Molding Material

A superior thermoplastic material for low loss purposes, Bakelite polystyrene molding material (XMS-10023), is announced by Bakelite Corp., New York City. Material has a loss factor of less than .00053, a power factor of less than .0002, and a dielectric constant of 2.60 at 60 cycles, 1,000 cycles and 1,000,000 cycles, and offers marked advantages for many electrical products and equipment parts. Its dielectric strength is more than 500 volts per mil; its resistivity 10^8 megohm-centimeters; and its arc resistance 240-250 seconds. Tests indicate that no noticeable change occurs in electrical properties with an increase in temperature or humidity. It also has the merits of: uniformity in molding; freedom from crazing or surface difficulties; permanence of dimension; and high resistance to water, acids and alkalies.

Lacquer Coloring Process

Successful application of a method for forming dyes within a lacquer rather than adding the dyestuff to the solvent is claimed in a recent German patent. Inventor adds to the lacquer a leuco dyestuff base and chromic acid or its salts in solid form, and heats gently to produce a light-resistant complex chromium dyestuff. In an example, 100 parts of a lacquer consisting of 100 parts nitrocellulose, 100 parts normal butyl alcohol, 150 parts ethyl lactate, 250 parts butyl acetate, 375 parts ethyl alcohol, 20 parts triphenyl phosphate and 5 parts adipic acid ester are used to dissolve 0.5 parts of the leuco base of Erichrome Azurol B. The solution is developed with 0.25 parts sodium bichromate and 0.25 parts oxalic acid by gentle heating. A blue lacquer of excellent light resistance is obtained. *Chemical Trade Journal,* Nov. 19, '37, p. 464.

Chemical Specialties for Industry

A digest of new uses and new compounds

Rodenticides and Eradication of Rats

Chemistry in the Role of a Modern Pied Piper

By Benjamin Levitt

PRESENT rodent eradication depends almost wholly on chemical and biochemical research. There are several species of rats. The brown rat, *rattus norwegicus* or Norway rat; brown rat, house or sewer rat, is most commonly distributed. The black rat, *rattus rattus*, English or ship rat, was known in Europe in the 12th century, and transferred to America four centuries later. The roof rat, ***rattus alexandrinus***, or Alexandrian rat, is considered to have originated in Egypt. This is presumed to be of the same species as the black rat. Thus it will be noted that these vermin are distributed over every continent.

There are 591 establishments which render exterminating service in the U. S., according to the 1935 census, and their annual receipts amount to $6,357,000. While only part of this amount represents expenditure for rat control, by far the greater portion of the total cost is spent privately by farmers, householders, mercantile establishments and state and Federal governments.

The U. S. Public Health Service estimates that the damage by rats, done to property, amounts to $200,000,000 annually. Dr. Rosenau in his book, Preventive Medicine and Hygiene, says: "Rats destroy grain while growing; invade stores, destroy flowers, laces, silks, carpets, eat fruits and vegetables, meats in the markets; destroy by pollution, ten times as much as they eat; cause conflagration by dragging matches into their holes; gnaw lead pipes and floors of houses; ruin artificial ponds and embankments by burrowing; destroy eggs and young poultry; damage foundations, floors, doors, piers; in short, they have become the worst mammalian pest among us."

Of more serious concern, however, than these depredations to property, is the fact that rats are disease carriers. Bubonic plague, which has destroyed millions of lives is attributed to transmission by rats. Rats also are affected by tapeworm, trichina and several other communicable diseases.

Trapping of rats and mice involves the necessity of final disposition, which is not only offensive, but ofttimes embarrassing. Chemical substances used for extermination are barium sulfate, thallium sulfate, arsenic trioxide, phosphorus, zinc phosphide, plaster of Paris, red squill, hydrocyanic acid gas, strychnine, sulfur and other substances.

Methods of Control

Certain viruses have been used as exterminators, but the U. S. Public Health Service does not recommend them on account of cost, uncertain action, instability and possible creation of an immunity to their effect.

U. S. Drug Administration Bul. 238 says, that thallium is among the most toxic substances recommended for rat control. Comparative tests with other rat poisons show the following minimum lethal doses:

	Mg. per Kilo of body weight
Thallium	25
Arsenious oxide	20–25
Red squill powder	250
Barium carbonate	750

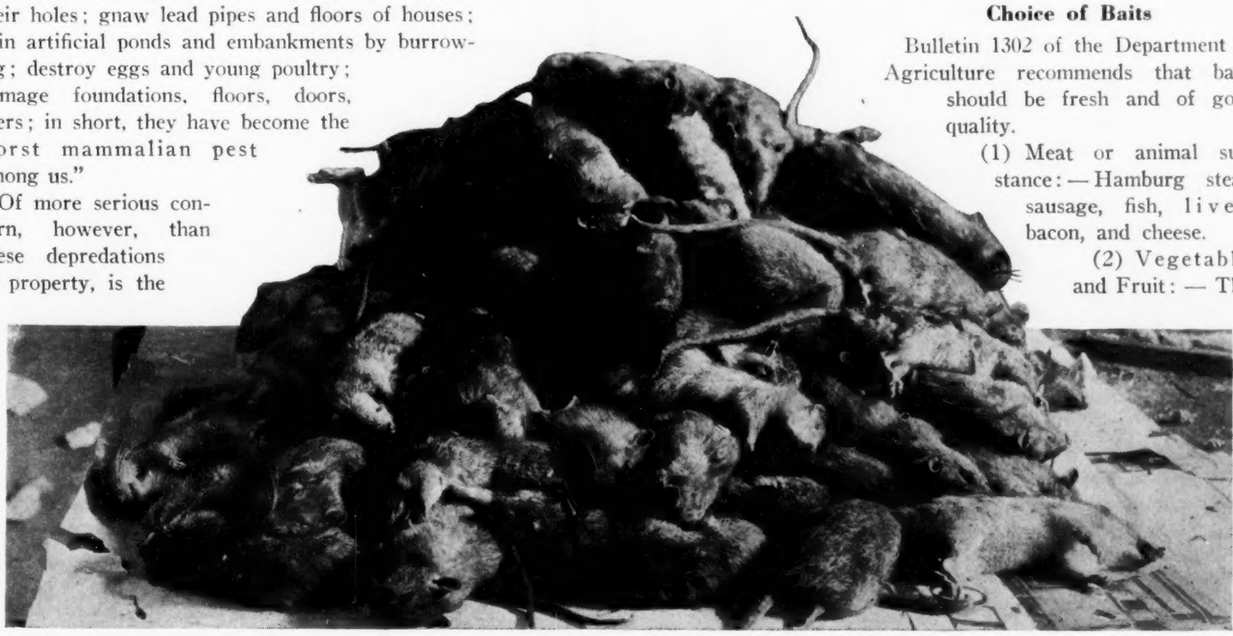
On account of its poisonous nature, thallium sulfate should be handled with rubber gloves in mixing.

Choice of Baits

Bulletin 1302 of the Department of Agriculture recommends that baits should be fresh and of good quality.

(1) Meat or animal substance: — Hamburg steak, sausage, fish, liver, bacon, and cheese.

(2) Vegetables and Fruit: — Thin



slices of musk melon, apple, tomato, or cucumber, canned corn, squash, or pumpkin seed; mashed banana, boiled carrots, or baked sweet potato.

(3) Cereals:—Rolled oats, Jewish or non-milk bread, corn meal, flour, and cake.

Preparation

Non poisonous: (1) Mix thoroughly, 1 part plaster of Paris and 2 parts of rye flour.

Red squill as a rat poison has the distinct advantage in that it is not toxic to human beings and domestic animals. On most animals, it acts as an emetic, but the rat does not vomit, and therefore red squill is practically a poison specific to rodents.

R. E. Buck and C. R. Fellers, *I.E.C.*, 27 pages, 1497-9, 1935, found that extracts prepared from red squill powder, by means of a soxhlet apparatus, with methyl and ethyl alcohols, are more toxic than extracts prepared by shaking or stirring. For large scale production, extracts may be prepared by percolation. Extract baits are more palatable and more easily standardized than red squill powder.

Farmers Bul. 1533, U. S. Dept. of Agriculture, recommends:

(2) Mix one ounce powdered red squill with one pound oatmeal, graham flour, or corn meal, or bran.

(3) Liquid red squill should be used only with dry bait capable of absorbing double its weight of liquid. Cut one-half pound bread into cubes, pour one pint liquid red squill over them, and mix with spoon. Several cubes are used for each bait.

The Department of Agriculture states that strychnine is readily detected by rats and is too rapid in its action, which makes its use undesirable in buildings. However, here are formulae to illustrate its use:

Poisonous:

(1) Barley poisoned with one-quarter per cent. strychnine and sweetened with saccharine or raisins, figs and wheat may be chosen as bait.

(2) Leaflet B S 78 of the Bureau of Biological Survey recommends mixing one tablespoonful of gloss starch in one-quarter teacup of water and stirring into three-quarters pint of boiling water to make a thin clear paste. Mix one ounce of powdered strychnine alkaloid with one ounce of baking soda and stir into the starch to smooth creamy mass free of lumps. Stir in one-half pint of heavy corn syrup and one tablespoon of glycerin or petrolatum. Apply to 10 pounds of canary seed, mix thoroughly to coat each kernel, and spread on paper to dry.

A phosphorus paste analyzed by the Bureau of Chemistry, was found to contain two per cent. phosphorus, with corn starch and glucose as bait. Such a preparation is spread on bread or crackers.

The U. S. Public Health Service recommends three to five per cent. phosphorus mixed with glucose and spread on bread. The same authority advises that 10 per cent. arsenious oxide (white arsenic) may be substituted for phosphorus in the same formula, or incorporated in a dough made of corn meal with white of egg.

Another formula containing phosphorus but combined as zinc phosphide is: Ground bread, 10 lbs.; corn oil, 1 lb.; and zinc phosphide, 10 oz.

One of the best poisons is barium carbonate, which can be used with comparative safety even in poultry run, if it is exposed behind boxes or boards so that it is inaccessible to live stock.

Barium carbonate	1 part
Fresh bait	6 parts

or make a dough of 25 per cent. barium carbonate, 75 per cent. oatmeal and one-quarter per cent. saccharine. This may be chopped into small granules.

In connection with $BaCO_3$, the writer came across an ingenious method of incorporation covered by U.S.P. 1,220,593. In this patent, pieces of sponge the size of a walnut are saturated with molten beef suet and bacon fat. The excess is squeezed out and the sponge is then rolled in this mixture: Sponge, 10 pounds; beef suet, 20; bacon, 5; corn starch, 6; and barium carbonate, 2. The patentee states that sponge in texture and appearance simulates meat. The sponge absorbs some of the gastric juice and together with $BaCO_3$ creates a thirst, compelling the rat to leave the premises and die outside.

The Bureau of Biological Survey (B S 10) states that thallium sulfate is used under certain conditions in the control of ground squirrels, prairie dogs, rats and other rodents and moles. Studies have also been made on the possibility of secondary poisoning in man due to eating ducks or other birds which have been poisoned by thallium rodenticides. Results of these tests proved that the danger from secondary poisoning is practically nil.

Thallium poisons may be made up as follows: Rye bread, 97.5 per cent.; thallium sulfate, 2 per cent.; glycerin, one-half per cent.; grind thoroughly.

(2) Ground bread, 29 lbs., 6 oz.; fresh pork fat, 2 lbs.; ground fresh halibut, 6 lbs.; and powdered thallium sulfate, 10 oz.

Fumigation should be done only by skilled licensed exterminators. Calcium cyanide dusts are used. One authority gives the following as an effective fumigant: KNO_3, 30; S, 42; sawdust, 18; sand, 16 parts.

For outside work, exhaust gas from an automobile or gas engine can be used for destroying rats in their burrows.

A wad of cotton saturated with carbon bisulfide, stuffed into a rat hole, and then covered with mud, is a good fumigant.

Another clever device for trapping rats is covered by U.S.P. 1,382,922. This is not a poison but an adhesive which traps the rat. Linseed oil is specially cooked until thick, and five per cent. water added. Then, less than 20 per cent. rosin is dissolved therein, making a sticky-gum-like mass, of a strength sufficient to hold rats of large size. A bait is probably used to attract the rodent to the adhesive.

In conclusion, the most recent contribution to rat catching is the invention of an electric plug-in device, which electrocutes the animal when it munches a piece of cheese.

Tar-Oil Varnishes

The difficulty of obtaining adequate supplies of vegetable oils, together with the comparative plentifulness of coal-tar distillates, have directed the attention of German manufacturers to the possibilities of making further use of coal-tar in paint and varnish production. Experiments conducted by E. Stock, Krefeld School of Dyeing, are reported in *Farben-Zeitung*, Nov. 13. A regenerated or prepared tar obtained by the admixture of solid pitch with neutral coal-tar oil of specific gravity 0.99 was used and the following compositions are given as proving satisfactory in preliminary tests:

Red roofing varnish—2 kgs. dark rosin, 0.5 kg. coal-tar pitch, 2.2 kgs. rosin oil, 0.3 kg. precipitated manganese resinate, 1.2 kg. heavy tar oil, 1.5 kg. red iron oxide.

Black roofing varnish—2 kgs. coal-tar pitch, 2 kgs. crude rosin oil, 0.3 kg. precipitated manganese resinate, 1 kg. heavy coal-tar oil, 0.3 kg. carbon black.

Black tar varnish for iron—2.5 kgs. coal-tar pitch, 1 kg. asphalt, 0.5 kg. 5 per cent. gloss varnish, 0.01 kg. litharge, 2.5 to 3 kgs. heavy tar oil.

Tar oil varnish—1 kg. rosin, 0.1 kg. litharge, 4 kgs. pale tar oil.

As a general binding agent for the preparation of tar varnishes, he gives the following: Melt 2.2 kgs. rosin, then add 0.4 kg. linseed oil varnish and 0.05 kg. precipitated manganese resinate. Heat for one hour at 150° C., and after cooling add 1.8 kg. heavy tar oil. This binding agent is mixed with pigments in various proportions to give varnishes stated to be of quite general applicability. From the *Chemical Trade Journal*, Nov. 19, '37, p. 458.

Reduces Snow Glare

Snopake, product to reduce the excessive glare that is experienced during the winter months in buildings adjacent to open fields where large expanses of snow are present, is announced by the Skybryte Co., Cleveland, O. Product is a pale-green adhesive liquid that can either be brushed or sprayed on the windows. Manufacturer reports that it admits over 90% of the light yet reduces it to mellow softly-diffused illumination. It is applied to the inside or outside of the window and remains on the glass until removed with hot water and stiff bristle brush.

Printing Paste Thickening Agent

Keltex, a thickening agent for neutral and alkaline printing pastes said to be a pure sodium alginate product, made to rigid specifications and, therefore, always of uniform quality, is a product announced by Kelco Co., San Diego, Calif. It is entirely free from grit and other foreign impurities, and cost is said to be usually much lower than natural gums.

Buffing Compounds

New buffing compositions called Tri-Vac are being made by Bruco Products Corp., Detroit, Mich. These products are all produced under pressure. A definite scale of density has been established, which has been proven to have a definite relationship to the adhesiveness, and therefore effectiveness, of the product in question. Resistance to fracture is greatly improved by the increased density.

Tin Anodes for Alkaline Plating

High purity tin anodes for alkaline plating are being marketed by du Pont under the name, Pur-o-Tin. These anodes, superior to "Straits" tin, are cast from Vulcan's super-refined tin, and test 99.99% +, and are supplied at no advance in price over that of other specially cast anodes. Anodes are in the standard shapes proved by experience to be the most practical for both still and mechanical solutions. Included is a type designed to give maximum surface with minimum weight, which keeps down the investment involved.

Rubber-like Material

A synthetic rubber-like material which is finding a use in the production of several textile mill products has been developed by Armstrong Cork Company, Lancaster, Pa. The new material is said to be resilient and elastic, highly resistant to oil, slow to deteriorate, and extremely tough and durable. Spinning cots, temple rolls, roll coverings, friction drives and vibration absorbing blocks are among the textile mill products now being made with the unnamed material. Further details are expected to be made available in the near future.

Lacquer Resists Rust Inhibitors

A special type clear lacquer that can be used on equipment fabricated with lubricating oils containing rust inhibiting substances has been developed by Maas & Waldstein, Newark, N. J. The chemicals used in rust inhibitors badly discolor ordinary lacquers and this new product is said not to be discolored or otherwise affected by any of the commonly used rust inhibitors. Product is also resistant to humidity, salt spray, 10 per cent. hydrochloric acid and other chemicals, as well as out-door exposure. It is tough, durable, and strongly adherent and will stand up well under stamping, forming, and other mechanical operations so that it is especially suited for use on name-plates. It can be applied to aluminum, brass, copper, and other metals by dipping and spraying, and it air dries rapidly.

Perspiration-proof Lacquer

A clear lacquer that is resistant to perspiration is announced by Maas & Waldstein Co., Newark, N. J. Lacquer is applied by dipping or spraying and air-dries out of dust rapidly. After hardening for a few days, it becomes practically insoluble and resistant to moisture, soap and water, and perspiration. It is useful for finishing products, such as flashlights, that are constantly held in the hands. Used on steel products, this lacquer provides a much higher degree of protection against rusting than ordinary lacquers, according to the manufacturer. It is also supplied in grades suitable for finishing copper, brass, and aluminum.

Rayon Size

A sodium alginate product for sizing rayon and acetate warps is being made by Kelco Co., San Diego, Calif. Product is said to give excellent loom performance and to be easily removed by washing.

Bright Pickle for Brass

A non-fuming, non-tarnishing product, Industro Bright Pickle, for brass removes all tarnish and oxide film from the surface of brass and imparts to it a durable and attractive satin finish. Articles so treated have retained this finish without showing signs of tarnish for one year on the storage shelves of several manufacturers. The maker, Industrial Chemical Products Co., Detroit, Mich., states it is a non-fuming acid solution, made in concentrated form, diluted with three parts of water, and is used at room temperature. The very desirable results described are secured by the formation of an invisible and protective chemical coating on the surface of the metal. No lacquer is used.

Resistant Finish

"Japco Devilac," a new glass-hard, waterproof, chemical-proof finish, available in clear and colors, is announced by Jamestown Paint & Varnish Co., Jamestown, Pa.

Quick facts are: (1) Dries hard in 15 minutes. (2) Requires no primer. (3) Flows out smooth. (4) Unharmed by acids, alkalis, alcohol or gasoline. (5) Is highly adhesive; bonds perfectly with galvanized metal. (6) Can be used on wood, metal or concrete. (7) Has remarkable toughness and durability.

Temporary Coating

Protex is a non-inflammable material sold in concentrated form and can be thinned with distilled water to a consistency suitable for brushing, spraying or dipping like paint. Its purpose is to provide a temporary coating—a thin tough elastic film—for protecting highly finished surfaces throughout manufacture, storage and shipment. It prevents the scratching of stainless steel, aluminum, plated and lithographed metals.

The freshly applied coating of Protex must be dusted with soapstone, powdered mica, whiting or talc, or covered with paper to make it easy and convenient to handle. Craft paper can be immediately spread over the freshly Protexed surface in the same way as wallpaper is put on. Material is a product of Hayden F. White & Co., Cleveland, Ohio.

Air Line Freeze Preventive

An improved system of air line and air tool freeze preventive known as "Frosto" is being marketed by Sullivan Machinery Co., Michigan City, Ind., to supplement "Tanner Gas" which has proven so successful on construction, industrial and mining operations. Frosto has been developed particularly for industrial applications and wherever electric current is available for its operation. In operation, it is vaporized in a "vaporizer" and is fed into the compressed air line near the compressor as fast as necessary to prevent freezing of water vapor in the compressed air lines and air tools. System is very effective and economical, current consumption is small and thermostatically controlled and only about a quart of Frosto is required to treat 100,000 cu. ft. of free air under the worst conditions of temperature and humidity.

New Trade Marks of the Month

334,017. Wm. C. McDuffie, as receiver Richfield Oil Co. of Calif., Los Angeles, Calif.; Jan. 17, '33; gasoline; use since Apr. 30, '32.

375,765. Marquette Cement Mfg. Co., Chicago, Ill.; Mar. 9, '36; Portland cement and other building cements; use since Jan. 21, '36.

377,804. Pure Oil Co., Chicago, Ill., Apr. 29, '36; liquid hydrocarbon motor fuel, lubricating oils and greases; use since Apr. 21, '36.

389,856. Warwick Chemical Co., West Warwick, R.I.; Mar. 9, '37; water repellent compound for processing textiles; use since Jan. 15, '37.

394,641. Joseph Smidt, Chicago, Ill.; June 28, '37; paint, wall paper, Venetian blinds, furniture, etc., cleaners, also shoe and metal polishes; use since Aug. 1, '36.

381,168. Old Dutch Process Mfg. Co., Brooklyn, N. Y.; July 18, '36; furniture and automobile polish, liquid wax, ready mixed paints, and prepared shellac; use since Jan., '36.

382,153. Frank C. Feise (F. C. Feise Co.), Roxborough, Phila., Pa.; Aug. 14, '36; tennis court clay surfacings of various colors; use since May 15, '36.

384,715. Reefer-Galler, Inc., New York City; Oct. 23, '36; insecticides, insect exterminators, repellents, deterrents, and preventives; use since Feb. 4, '36.

389,855. Warwick Chemical Co., West Warwick, R. I.; Mar. 9, '37; water repellent compound for processing textiles; use since Jan. 15, '37.

385,173. American Maize Products Co., New York City; Nov. 5, '36; raw or partly prepared starch for various industrial purposes; use since Oct. 22, '36.

385,954. F. Weber Co., Phila., Pa.; Nov. 24, '36; oil and water colors, paints, pastel and artists colors; use since Aug. 20, '35.

386,075. Flintkote Co., New York City; Nov. 28, '36; composition asphalt roofing materials; use since Oct. 15, '36.

386,400. Brooks Oil Co., Cleveland, O.; Dec. 7, '36; lubricating grease; use since 1931.

386,845. Wm. Borak (Pet Products Co.), New York City; Dec. 17, '36; concentrated cleaning powder for cleaning purposes; use since Sept. 8, '36.

389,854. Warwick Chemical Co., West Warwick, R. I.; Mar. 9, '37; water repellent compound for processing textiles; use since Jan. 15, '37.

390,380. Plibrico Jointless Firebrick Co., Chicago, Ill.; Mar. 22, '37; castable refractory material; use since May 6, '36.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, Nov. 16 through Dec. 14, inclusive.

394,745. Factory Oil Co., Akron, O.; July 1, '37; gasoline and oils; use since Jan., '37.

391,335. Osmo Garden Co., Phila.; Pa.; Apr. 14, '37; preparations for stimulating seed growth; use since Aug. 10, '36.

391,359. Toc's Products Co., Inc., Syracuse, N. Y.; Apr. 14, '37; disinfectant, deodorant, bleach, and germicidal preparation, water softener, ammonia, and insecticide; use since Jan. 1, '34.

391,916. Harry W. Kaylor, Hagerstown, Md.; Apr. 27, '37; diatomaceous silica; use since Jan. 1, '28.

392,641. E. F. Houghton & Co., Phila.; May 12, '37; cutting oils; use since Apr. 23, '37.

393,459. John Alexander Waer, Los Angeles, Calif.; May 29, '37; canned oils and greases for automobiles; use since May 25, '37.

394,746. Factory Oil Co., Akron, O.; July 1, '37; gasoline and oils; use since Jan., '37.

395,356. S. Schwabacher & Co., Inc., New York City; July 17, '37; Russian mineral oil for pharmaceuticals, cosmetics and general industrial arts; use since Jan. 3, '30.

394,882. Chas. J. Cinsolo, Deer Park, Ohio; July 3, '37; chemical washing fluids; use since May 24, '37.

395,323. United Cast Stone Co., Bellevue, Mich.; July 16, '37; artificial stone; use since Sept. 9, '35.

395,739. Southern Oil Co. of N. Y., Inc., Horseheads, N. Y.; July 29, '37; gasoline, kerosene, motor fuel oils, and lubricating oils and greases; use since '28.

395,534. Carrie E. Marcelle, Phila., Pa.; July 22, '37; battery compound; use since May 29, '37.

395,718. National Accessories Stores, Inc., Utica, N. Y.; July 28, '37; anti-freeze; use since Nov., '35.

395,774. Unit Packages, Inc., Elizabeth, N. J.; July 29, '37; fire extinguishing chemicals; use since July 7, '37.

398,113. H. Kohnstamm & Co., Inc., New York; Oct. 4, '37; powder and pulp colors used in manufacture inks; use since 1882.

395,930. Royal Mfg. Co., Tulsa, Okla.; Aug. 2, '37; tool joint dressing in form lubricant; use since July 10, '35.

396,156. Pacific Distillers, Inc., Culver City, Calif.; Aug. 7, '37; solvent used in thinning paints; use since Mar. 5, '37.

396,529. Celluloid Corp., Newark, N. J.; Aug. 18, '37; plastics; use since July 2, '37.

396,224. Carrieres Dumon et Produits Calcaires du Tournaisis Societe Anonyme, Vaulx-near-Tournai, Belgium; Aug. 10, '37; Portland cements; use since Feb., '10.

Textile Finish

A textile finish assistant is announced by du Pont in "Avitex" M (Patented), a specially sulfated fatty alcohol recently developed. It is designed primarily as a softening agent for use with high concentrations of Epsom Salts, such as are employed in the preparation of heavily-weighted finishes where the stiffening effect of starch products or minerals is to be avoided. New product forms clear, stable emulsions, in the presence of Epsom Salts, which show no separation on prolonged heating, thus eliminating formation of oil spots on fabrics and loss of material from the bath.

Chlorinated Rubber Paints

German experiments with chlorinated rubber paint made from the synthetic rubber have shown that the new product reveals considerable stability to the effects of the weather as well as high resistance to chemical reactions. Powers of adhesion and elasticity were also satisfactory; however, tests indicated that the drying properties of the synthetic chlorinated rubber paint were deficient, and further research work will have to be undertaken to remedy this defect. Product has been found to be practically indispensable for a variety of technical uses, such as the lining of vats protecting the underlying surface against the effects of various kinds of chemical substances. (American Consulate General, Frankfort-on-Main.)

PAN-AMERICAN COLOR & CHEMICAL CO. 396,236

ABERITE 396,727

LAY-AN-GROW 396,938

Barrett 397,174

397,259

SOUTHPORT HI-TANE SUPER GASOLINE 397,387

Sudol 397,489

MIDCLEAN 397,545

Spot Color 396,249

PERVO HOLLAND DUTCH 397,000

HYDROCYL 397,208

TRUELIGHT FLAT 397,501

397,260

GC 397,437

INTRAFIL 397,549

OILOY 396,584

"RAY-O-LITE" 397,103

Esso 397,006

BLUE CLUB MOTOR OIL 397,277

ROK-HESIVE PERMANENT PROTECTION 397,553

GROWMASTER 397,296

Emery 396,712

ZUD 397,052

COLORLUX 397,611

GC 397,438

BKC 398,082

DEADLINE 396,667

BEAU-KNOT 397,123

LUBRI-ZOL 397,583

VERDITE 397,297

396,236. Pan-American Color & Chemical Co., Inc., Paterson, N. J.; Aug. 10, '37; dyes and chemicals; use since Apr. 15, '37.

396,249. Ditto, Inc., Chicago, Ill.; Aug. 10, '37; ink; use since Apr. 29, '36.

396,584. Universal Motor Oils Co., Inc., Wichita, Kans.; Aug. 19, '37; lubricating oils and greases, gasoline, and motor fuel oil; use since July 27, '37.

397,103. Percy McNeill Garrod (Garrod Products), Port Richmond, S. I., N. Y.; Sept. 3, '37; cleansing composition for glasses, dishes, etc.; use since June, '36.

396,712. Emery Industries, Inc., Cincinnati, O.; Aug. 24, '37; candles; use since 1840.

396,667. California-Spray Chemical Corp., Wilmington, Del., and Richmond, Calif.; Aug. 23, '37; insecticide barriers for banding trees and other exposed surfaces; use since Jan. 23, '36.

396,727. Aberdeen Labs., Inc., New York City; Aug. 25, '37; boiler compounds, water treatment compounds, etc.; use since Aug. 10, '37.

396,938. Van Camp Sea Food Co., Inc., Terminal Island, Calif.; Aug. 30, '37; fertilizer; use since Aug. 14, '37.

397,000. Herman H. Van Dulst (Pervo Co.), Los Angeles, Calif.; Sept. 1, '37; penetrating paint paste for use on stucco, etc.; use since Sept. 5, '23.

397,006. Standard Oil of N. J., Wilmington, Del.; Sept. 1, '37; floor dressing; use since June 29, '37.

397,052. Rustain Products, Inc.; New York City; Sept. 2, '37; rust and stain remover for bath tubs, etc.; use since Aug. 20, '37.

397,123. Wm. T. Knott Co., Inc., New York City; Sept. 4, '37; soaps, chips, powder, etc.; use since Oct., '31.

397,174. Barrett Co., New York City; Sept. 7, '37; stains, ready mixed paints, and thinners; use since 1906.

397,208. Winner Mfg. Co., Inc., Trenton, N. J.; Sept. 7, '37; plain and decorative surface coating and sealing material in form of cellulosic lacquer; use since Aug. 25, '37.

397,501. Cook Paint & Varnish Co., No. Kansas City, Mo.; Sept. 17, '37; ready mixed paints; use since Nov. 9, '36.

397,277. Cities Service Oil Co., Bartlesville, Okla.; Sept. 10, '37; lubricating oils for motors and engines; use since June, '23.

397,611. John P. Cochran Co., Cleveland, O.; Sept. 21, '37; ready mixed paints, paint enamels, lacquers, and varnishes; use since Sept. 1, '37.

397,583. Lubri-Zol Corp., Cleveland and Wickliffe, Ohio; Sept. 20, '37; lubricating oils—greases, lubricating oil compositions and motor lubricating oils, particularly for Diesel engines; use since Sept. 10, '37.

397,259. R. H. Macy & Co., Inc., New York City; Sept. 9, '37; ready mixed paints, varnishes, enamels, floor wax, primers, etc.; also furniture polish; use since Mar. 28, '31 on furniture polish; since Mar., '32, on remaining items.

397,260. R. H. Macy & Co., Inc., New York City; Sept. 9, '37; ready mixed paints, paint enamels, varnishes, varnish stains, paint oils, fillers, lacquers; use since March, '32.

397,296. Plant Food Corp., Los Angeles, Calif.; Sept. 10, '37; fertilizers; use since Aug. 13, '37.

397,297. Plant Food Corp., Los Angeles, Calif.; Sept. 10, '37; fertilizers; use since Mar. 11, '35.

397,387. Southport Petroleum Co., Kilgore, Tex.; Sept. 13, '37; gasoline, use since Apr. 29, '36.

397,437. General Chemical Co., New York City; Sept. 15, '37; heavy chemicals; use since June, '29.

397,438. General Chemical Co., New York City; Sept. 15, '37; heavy chemicals; use since June, '29.

397,489. Sudol Products, Inc., New Orleans, La.; Sept. 16, '37; water repellent preparation for fabrics and garments to prevent discoloration by perspiration; use since July 27, '37.

397,545. Midland Chemical Labs., Inc., Dubuque, Iowa; Sept. 18, '37; liquid neutral cleanser for linoleums, rubber, cork floors, varnished woodwork, etc.; use since Aug. 31, '37.

397,549. Purex Corp., Ltd., South Gate, Calif.; Sept. 18, '37; bleach and water softener; use since Sept. 7, '37.

397,553. Rok-Hesive Mfg. Co., Glendale, Calif.; Sept. 18, '37; coatings and fillers in form of paint for artificial and natural stone; use since Aug. 1, '36.

398,082. Beck, Koller & Co., Inc., Detroit, Mich.; Oct. 4, '37; synthetic and processed natural resins; resin solutions; and oils; use since Sept. 16, '37.

Metaphosphate Fertilizer

T.V.A.'s agriculture division under the direction of Dr. H. A. Morgan, has developed a new metaphosphate fertilizer which contains 60 to 65 per cent. plant food available as against the former best records of 16 to 20 per cent. This means that the farmer will have to use one ton of fertilizer where formerly he used four tons, thus saving great sums in handling, bagging and transportation, as well as his own time in spreading.

Cement-Latex Compositions

In a paper on cement-latex compositions for flooring, read at the meeting of the London and District Section, Institution of the Rubber Industry, W. G. Wren presented results of the experimental work carried out at the Imperial Institute, Kensington. It was found regarding physical properties that these could be widely modified by changing the mixtures by the addition of small quantities of suitable compounding ingredients or by varying the proportions of cement to rubber. Simple changes in composition resulted in products that might be almost as hard as concrete or soft as rubber. The mixtures have excellent mechanical properties, are attractive in appearance, and if light aluminous cement or "Snowcrete" is used, it is possible to obtain mixtures that lend themselves to very bright coloring; but even with ordinary aluminous cements, which do not take on very bright colors, interesting mosaic effects are possible. So far it has not been possible to obtain a perfectly polished surface, although some attractively finished commercial samples were produced.

The mixtures have the advantage of possessing very good non-skid properties which are retained to a high degree even when they are wet. They also have good heat- and sound-insulating properties and are practically non-inflammable. Various uses have already been found for these materials, and many others suggest themselves. *India Rubber World*, Dec. 1, '37, p. 69.

MUSKEETUM MAKES-EM-SCRAM 397,633 · Creole 397,913 · SEE MORE 398,060 · NINE POINT 398,353 · MIMEOGRAPH 398,567 · PERMALUBE 397,742

Lacquer synthetics 397,732 · BECLOR 397,962 · PIONEER 398,769 · AGICIDE 398,598 · ADSAL 395,887 · FLAXYL 395,854

HYFAST 397,970 · JAXITE 398,384 · AROX 397,985 · MIRACLO 397,573 · AGICIDE 398,600 · Ruflux 398,067

BENITE 397,789 · SKID ADHESIVE TAPE REMOVER 398,016 · F77 398,428 · NU-CARB 398,621 · DupliMAT 399,544

REDIGLOW 397,836 · BACTERGENT 398,088 · ELECTROLUX 398,468 · PlasteRez 398,623

ZATEX 397,894 · Grobelle 398,044 · FULL-PAK 398,131 · Tiranal 398,476 · Superflo 399,354 · PLASTERITE 398,624

GUNTEX 397,902 · ALUMINECK 398,179 · ROLUBRICANT 398,180 · Testone 398,494 · BECKAMINE 398,658 · I-X-L 397,235

397,633. Harold A. E. Wenger (Regnew Labs.), Madison, Wis.; Sept. 21, '37; insect repellent material; use since Mar. 12, '36.

397,732. A. C. Buschman & Co., Inc., New-ark, N. J.; Sept. 23, '37; synthetic lacquers and varnishes; use since May 27, '37.

397,789. Bennett, Inc., Cambridge, Mass.; Sept. 25, '37; paper filler or powdered paper-making ingredient; use since Sept. 1, '37.

397,836. Geo. E. Bennett (E. W. Bennett & Co.), San Francisco, Calif.; Sept. 27, '37; polish for painted, lacquered, and finished surfaces; use since Aug. 23, '37.

397,894. Atlas Powder Co., Wilmington, Del.; Sept. 28, '37; cellulose derivative solutions; use since Aug. 25, '37.

397,902. Flintkote Co., New York City; Sept. 28, '37; sprayable bituminous emulsions; use since Aug. 3, '37.

397,913. Camille J. Rocquin (Wild Rose Nursery), New Orleans, La.; Sept. 28, '37; material for improving texture fertilizers; use since July 9, '37.

397,962. Buffalo Electro-Chemical Co., Inc., Buffalo, N. Y.; Sept. 30, '37; for hypochlorites; use since Jan. 15, '37.

397,970. Huron Portland Cement Co., Detroit, Mich.; Sept. 30, '37; Portland cement; use since Sept. 23, '37.

397,985. Silver Oxide Products Co., Inc., Aldan, Pa.; Sept. 30, '37; colloidally dispersed silver oxide; use since Mar. 19, '34.

398,016. Wm. Radoff, New York City; Oct. 1, '37; adhesive tape remover fluid; use since June, '37.

398,044. Grobelle Liquid Plant Food Co., Inc., New York City; Oct. 2, '37; plant food; use since June, '37.

398,060. Joseph Smidt, Chicago, Ill.; Oct. 2, '37; paints, varnishes, and enamels, also automobile and furniture polishes; use since Aug. 1, '36.

398,769. Georgia Kaolin Co., Elizabeth, N. J.; Oct. 21, '37; clay used in manufacture ceramics; use since Sept. 10, '37.

397,573. Filtrol Co. of Calif., Los Angeles, Calif.; Sept. 20, '37; adsorptive and purifying material for treatment dry cleaners' solvents; use since June 26, '37.

398,088. Calgon, Inc., Pittsburgh, Pa.; Oct. 4, '37; water softener having insecticidal properties, for use in washing glasses used in Public Service, dairy bottles, etc.; use since Sept. 27, '37.

398,131. Southwest Grease & Oil Co., Wichita, Kans.; Oct. 4, '37; lubrication grease; use since Sept. 13, '37.

398,179. Standard Oil Co. of N. J., Wilmington, Del.; Oct. 5, '37; lubricating greases; use since Sept. 9, '37.

398,180. Standard Oil Co. of N. J., Wilmington, Del.; Oct. 5, '37; lubricating greases; use since Sept. 9, '37.

398,353. Louis M. Goldman (Lou Bob Co.), Chicago, Ill.; Oct. 11, '37; lubricating oils; use since July 24, '37.

398,384. Otto C. Baltz (Jackson Labs.), Phila., Pa.; Oct. 12, '37; automobile polish; use since Aug. 13, '37.

398,428. Franklin Research Co., Phila., Pa.; Oct. 13, '37; compositions for applying finishing coatings to real or imitation leather or rubber; use since Jan., '34.

398,468. Electrolux, Inc., New York City; Oct. 14, '37; insecticides; use since Feb., '37.

398,476. Lingner-Werk Vertriebs, G. m. b. H., Dresden-A, Germany; Oct. 14, '37; disinfectant and antiseptic; use since Jan., '19.

398,494. Samuel Rosenberg (Templar Products Co.), New York City; Oct. 14, '37; anti-freeze; use since Sept. 1, '37.

398,567. A. B. Dick Co., Chicago, Ill.; Oct. 16, '37; fluid for stencilling and softening stencils and stencil paper; use since Apr., '34.

398,598. Agicide Labs., Milwaukee, Wis.; Oct. 18, '37; insecticides; use since May 16, '36.

398,600. Agicide Labs., Milwaukee, Wis.; Oct. 18, '37; insecticides; use May 16, '36.

398,621. E. F. Houghton & Co., Phila., Pa.; Oct. 18, '37; composition of carbonaceous material and energizer for carburizing steel; use since Oct. 8, '37.

398,623. I. F. Laucks, Inc., Seattle, Wash.; Oct. 18, '37; wall coating material in form of heavy bodied paint; use since Oct. 5, '37.

398,624. I. F. Laucks, Inc., Seattle, Wash.; Oct. 18, '37, wall coating material in form of heavy bodied paint; use since Oct. 5, '37.

398,658. Beck, Koller & Co., Inc., Detroit and Ferndale Sta., Detroit, Mich.; Oct. 19, '37; synthetic resin; use since Oct. 1, '37.

397,742. Amer. Oil Co., Balto., Md.; Sept. 24, '37; lubricating oils; use since Feb., '37.

395,887. H. Kirk White & Co., Oconomowoc, Wis.; July 31, '37; cleaning compound-non-explosive solvent which removes grease-oil spots from clothing and leather goods, also type cleaner; use since Apr. 30, '37.

395,854. Cellulose Holdings, Ltd., New York City; July 31, '37; chemical compounds for impregnating and coating textiles and papers; use since Apr. 10, '37.

398,067. Titanium Alloy Mfg. Co., Niagara Falls, N. Y.; Oct. 2, '37; welding fluxes; use since June 18, '37.

399,544. Addressograph - Multigraph Corp., Euclid Village, Cleveland, O.; Nov. 10, '37; ink; use since Oct., '37.

399,354. Hall Hardware Co., Minneapolis, Minn.; Nov. 5, '37; lubricating oils and greases; use since July 1, '35.

397,235. Tri-State Development Corp., Burnsville, N. C., and Washington, D. C.; Sept. 8, '37; cleaning, scouring and polishing powder; use since Aug. 24, '37.

Transparent Rubber

When a pure gum stock of rubber and sulfur is vulcanized, it has a high degree of clarity, but on the other hand exhibits poor physical properties and cost is relatively high. In order to obtain rubber products which are both transparent and have good physical properties, a compounding ingredient, "Carp Brand" magnesium carbonate (made in Japan), has been developed. When compounded with rubber, even in relatively large amounts, it will not destroy original transparency of the pure gum stock. This property is due to the fact that it has essentially the same refractive index as that of vulcanized rubber. Through a special manufacturing process the carbonate is produced as minute globules. Because of this particle size and shape, the necessary and desirable physical qualities are said to be imparted to the finished product. It is recommended for the manufacture of crepe soles, transparent bicycle tires, rubber bands, and rubber products which are required to allow a high degree of light transmission. *India Rubber World*, Dec. 1, '37, p. 88.

Plastic Container for Fruits

A large German canning establishment is producing a satisfactory container for preserved foods from a transparent plastic material known as acetyl cellulose which is treated with oil lacquer, according to a report from the American Consulate at Leipsig, made public by the Chemical Division, Department of Commerce.

FOUNDATION-CHEMURGIC CONTINUE

W. W. Buffum Announces Plans at Synthetic Organic Annual Meeting—Alcohol Plant to Run—Dr. Merz Re-elected President S. O. C. M. A.—Kraus, President-elect, A. C. S.—Kendall Donates Prize—

"What about the future of the Chemical Foundation and the Farm Chemurgic?" This question has been asked thousands of times in and out of the chemical industry since Francis P. Garvan's death on Nov. 7. The answer was given at the annual luncheon meeting of The Synthetic Organic Chemical Manufacturers' Association, at the Chemists' Club, N. Y. City, Dec. 16, by Mr. Garvan's close associate, William W. Buffum, treasurer and general manager of the Foundation.

Mr. Buffum pointed out that it was most fitting that the answer be given at a meeting of the S.O.C.M.A., because of Mr. Garvan's long and close association with that organization, and in a reminiscent mood he recalled that Mr. Garvan had employed him exactly 20 years previously to the day, even to the hour.

The Foundation and Chemurgic Council will continue to function, according to Mr. Buffum, and will be directed by Wheeler McMillen, editor of *Coun'ry Life*, as president, and Willard H. Dow of Dow Chemical, as first vice-president.

"We shall carry to completion the things Mr. Garvan started," Mr. Buffum said. "Much depends upon the interest of the chemical industry and other industries in our work and our plans for the future." He stressed the fact it was not so much financial support as moral support that they were seeking now, but assured his listeners that much of the work of The Farm Chemurgic Council had been so conclusive that the movement could not be halted.

Mr. Buffum opened his extemporaneous talk by extolling the work of Dr. Charles H. Herty in cellulose, and then reported briefly on the pure research on cellulose being carried on at the Boyce Thompson Institute, and announced that M.I.T. is now cooperating with a comprehensive course in cellulose chemistry and a number of active fellowships. All of these activities are being coordinated and directed by Dr. Herty.

The Foundation's excursion into power alcohol was vigorously defended by Mr. Buffum. Said he, "We have known of the criticisms and opposition but have purposely refrained until now from answering." The speaker disclosed that the Atchison, Kansas, plant has a capacity of 10,000 gals. of anhydrous alcohol daily; that the process is radically different from any other in operation; that the plant has successfully made a number of trial runs under varying conditions and is using 11 different raw materials grown within a 50 mile radius of the site. He also stated that a byproduct concentrated protein feed is being recovered, but that momentarily the carbon dioxide is being wasted. Another year will be required definitely to establish the fact that current experimental work can be turned into a profitable commercial operation.

The plant is now owned by the Atchison Agrol Corp., with the Chemical Foundation controlling 83% of the stock. Agrol is being marketed through 2,000 filling stations in 5 midwest states, wide distribution having been purposely planned, but Mr. Buffum reported that this was causing some embarrassment because the supply was not adequate to meet demand. Two independent petroleum refiners are now blending the gasoline-alcohol mixture and additional ones will enter the field shortly.

Mr. Buffum then pointed out that the petroleum industry would be better off with 90% of the fuel consumption of a prosperous community than with 100% of an impoverished one. All industries stand to gain, he pointed out, for the farmer is a famous spender when he has money. Mr. Buffum predicted that Atchison operations would prove that 1,000 other similar communities could benefit by similar power alcohol plants. "Ask the merchants in Atchison what they think of power alcohol," he suggested.

The Foundation and the Chemurgic Council are pushing an ambitious program. A second plant for the production of starch from sweet potatoes, similar to that at Laurel, Miss., will shortly be in operation. A practical demonstration in Kansas shows that grain sorghums can be grown in the more northerly belt of the midwest states, and what is of greatest significance, the income of the farmer can greatly be increased. Actual trials have shown an average of $84 an acre with grain sorghum as against only $9 per acre for corn. Further, grain sorghums are highly drought resistant.

Last summer it was found that castor bean plants are a protection against the ravages of grasshoppers. Additional study has shown that the inner portion of the castor bean branches contains a fine source of long cellulose fibres, while the balance is made up of exceptionally pure cellulose. Since castor bean plants can be grown to maturity in four months tremendous new possibilities have been opened up, and in Mr. Buffum's opinion, this discovery is one of the major contributions to date of the Farm Chemurgic movement.

All Officers Re-elected

Opening the meeting President August Merz spoke briefly on Mr. Garvan's contributions to chemical industry. Later Dr. Herty told many incidents of their close association and reported on late developments in his research work at Savannah. The future of this work is uncertain because of lack of funds, but Dr. Herty expressed the belief that a way would be found to continue.

At the meeting of the Executive Committee preceding the luncheon all the officers of the S.O.C.M.A. were reelected, with Dr. Merz entering his 11th term as president of the organization.

Kraus President-elect, A. C. S.

One of the most prominent scientists at Brown University is Prof. Charles A. Kraus, director of chemical research, whose contributions to chemistry, both pure and applied, have brought him distinction in his field rivalled by few chemists today.

His election as president-elect of the A. C. S. was announced Dec. 20. As head of the nation's largest and most important group of some 20,000 chemists, Prof. Kraus will take over the office of president on Jan. 1, 1939, succeeding Dr. Frank C. Whitmore of Pennsylvania State College.

Quiet, a research man since the days of his earliest training, and modest almost to the extreme in evaluating the significance of his work, Prof. Kraus is best known in the world of industrial chemistry for his researches which led directly to the commercial production of the so-called "high test" or ethyl gasoline. His investigations into anti-knock fuels were carried out in cooperation with one of the leading oil companies.

Kendall Sends Prize

Prof. James E. Kendall, head of the department of chemistry at Edinburgh University, Scotland, has given $1,000 to the A.C.S. for the '38 A.C.S. Award in Pure Chemistry, it was announced recently by Dr. Charles L. Parsons, secretary of the Society. Award, established in '31 by A. C. Langmuir to encourage creative work in pure chemistry by scientists at the beginning of their careers, will be made for 1938 at the Society's spring meeting in Dallas, Tex., April 18 to 21. Age limit, hitherto 30, has been raised to 35. Dr. Parsons will receive nominations until Feb. 5.

Dr. Kendall was professor at Columbia from '13 to '26, and subsequently head of the department of chemistry at N. Y. University.

Quicksilver Corp. of America, Fallon, Nev., will start operations again shortly.

Receives Perkin Medal

The Perkin Medal for '38 was presented Jan. 7 to Dr. Frank J. Tone, president of Carborundum, at a joint meeting of the American Section of the Society of Chemical Industry and the A.C.S., held at The Chemists' Club, N. Y. City. James G. Vail, chairman, presided over the meeting. After a talk on the life and accomplishments of the medalist by Dr. Carl G. Schluederberg, medal was presented to Dr. Tone by Professor Marston T. Bogert. After the presentation Dr. Tone gave his medal address entitled "The Quest for Hard Materials"—the story of abrasives.

Dr. Tone was born in Western New York in 1868, graduated from Cornell in '91. His connection with the chemical field dates from the inception of Niagara power in '95 when he became associated with Dr. Edward G. Acheson in the development of "Carborundum" as works manager and later as president of Carborundum. He became one of the pioneers not only in the development of electric furnaces on a large scale, but also in the new abrasive art which began with electrothermally produced abrasives. Paralleling his achievements in this field Dr. Tone was responsible for the application of these same products as refractories, thus initiating the super-refractories industry. He was also the original producer of electrically fused mullite and spinel. Silicon carbide electric heating elements are also a result of his work. Dr. Tone's outstanding contribution in the electrometallurgical field was the development of a large scale process for producing silicon metal, now widely used in making alloys of aluminum and steel and as a reducing agent in the manufacture of low carbon ferro alloys.

He was awarded the initial Jacob F. Schoellkopf Medal by the A.C.S., the Edward Goodrich Acheson Medal by The Electrochemical Society and an honorary degree of Doctor of Science by the University of Pittsburgh.

Dinkins Heads Section

Philip M. Dinkins, Cyanamid & Chemical vice-president, is the new chairman of the Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade. Charles E. Kelly, president, Hagerty Brothers & Co., is the new vice-chairman, and Robert B. Magnus, treasurer, Magnus, Mabee & Reynard, is now treasurer of the Section.

Banquet Date—March 3

The '38 Drug, Chemical and Allied Trades banquet will be held on Thursday evening, March 3, at the Waldorf-Astoria. Despite the record turn-outs in the past few years, an even larger attendance is expected. Each year the dinner attracts larger numbers of "out-of-towners."

Du Pont Pleads for Stabilized Conditions

Sees Industry Spending $25,000,000,000 and Providing Jobs for 3,000,000—Defends Private Management—N. A. M. Adopts "Platform for American Industry for 1938"—Asks Curb on Irresponsible Labor Leadership—

In his speech before The National Association of Manufacturers (held in N. Y. City early in December) Lammot du Pont pleaded for stabilization of the conditions under which industry operates, so that it could intelligently make plans and investments for future expansion.

In sounding the keynote of American industrial sentiment at the manufacturers' congress, Mr. du Pont visualized private enterprise investing $25,000,000,000 in new facilities, providing jobs for 3,000,000, if only the government would "lift the fog" of what lies ahead in taxation and stability were assured by labor. See Mr. du Pont's speech in full on page 15, this issue.

Industrialists Offer Recovery Plan

After two days of deliberation, a "Platform for American Industry for 1938" was adopted by the National Association of Manufacturers for the guidance of its 5,000 members, the largest organized employing group in this country.

The group, which had already admitted in speeches that a depression of uncertain gravity is now in existence and that lay-offs are proceeding, voted without dissent that progress could be resumed only if industry was "unshackled" by government and labor.

Platform declared there would be "no limits to this progress" if only a reasonable profit can be anticipated.

From the government, it asked the abandonment of "policies which have the effect of redistributing existing wealth and income instead of endeavoring to produce more national wealth and income." It also listed other "stop signals" hampering its progress. For labor, it laid down "nine principles," beginning with the open shop and declaring the necessity of statutory changes to preserve "the right of employees to bargain either collectively or individually."

COMING EVENTS

National Association of Dyers and Cleaners, Hotel Stevens, Chicago, Jan. 17-20.

Fifth International Heating & Ventilating Exposition, Grand Central Palace, New York City, Jan. 24-28.

The American Society of Refrigerating Engineers, 33rd Annual Meeting, Roosevelt, N. Y. City, Jan. 25-27.

American Institute of Mining & Metallurgical Engineers, Annual Meeting, N. Y. City, Feb. 14-18.

American Association of Petroleum Geologists, 23rd Annual Meeting, Roosevelt Hotel, New Orleans, March 16-18.

American Ceramic Society, 40th Annual Meeting, New Orleans, March 27-April 2.

National Petroleum Association, Cleveland, Ohio, April 13-15.

A. C. S., 95th Meeting, Dallas, Apr. 18-21.

Electrochemical Society, Hotel de Soto, Savannah, Ga., April 27-30.

International Petroleum Exposition, Tulsa, Okla., May 14-21.

10th International Congress of Chemistry, Rome, May 15-21.

Flavoring Extract Manufacturers' Association, Hotel Traymore, Atlantic City, June 27-29.

American Association for the Advancement of Science, Ottawa, June 27-July 2.

National Safety Council, 25th Annual Meeting, Hotel Stevens, Chicago, Oct. 10-14.

LOCAL TO NEW YORK

Feb. 11. Joint meeting, Society of Chemical Industry and A. C. S.

Start Chemical Laboratory

Steam shovels began excavating Dec. 6 for the new chemical research laboratory at Brown University, which when it is finished next summer will be one of the most complete of its kind at any university. Made possible by a $500,000 gift from former U. S. Senator Jesse H. Metcalf, laboratory will contain "unsurpassed" facilities for research in photochemistry and electrochemistry.

Revised Procedure Rules

Tariff Commission announces that revised rules of practice and procedure have been published in the Federal Register of Dec. 10, '37 and are effective as of that day.

In the new rules, provisions of general application, that is, those applying in common to all types of investigations, have been segregated, and those applying specifically to investigations under section 336 or section 337 presented separately, thus avoiding the duplications found in the previous set-up of the rules under those sections.

One new provision in the rules authorizes the holding of hearings by agents of the Commission. Since its creation the Commission has had authority to designate agents to hold hearings but it has heretofore not exercised that power in the administration of sections 336 and 337 and their predecessor statutes.

Probably the most important change in procedure deals with the question of furnishing interested parties, and the public, information concerning the Commission's activities in matters pending before it. Provision is made in the new rules for giving publicity at the time of filing applications for investigation under section 336 and to complaints under section 337, and for affording public inspection of the non-confidential parts of such applications and complaints at that time. It is expected that this procedure will facilitate the gathering of information by the Commission and expedite the Commission's decisions concerning applications and complaints.

A Happy New Year — a phrase into which each may read his own hopes for achievement during the months to come.

And, to all who read this greeting, The Calco Chemical Company extends sincere wishes for happiness and prosperity in 1938.

THE CALCO CHEMICAL COMPANY, INC. · BOUND BROOK, NEW JERSEY

Calco

A DIVISION OF AMERICAN CYANAMID CO

BOSTON · PHILADELPHIA · PROVIDENCE · NEW YORK · CHARLOTTE · CHICAGO · PATERSON

'37 Foreign Chemical Trade Reaches 7-Year High

Exports Estimated 16% Greater Than in '36—New Products In Demand—German Chemical Industry Forges Ahead—8 Groups Control 75% of Japanese Chemical Production—Chemical Salesmen's Ass'n New Officers—

Foreign trade in chemicals and related products expanded substantially during '37 with many lines attaining levels not touched since '29. While figures for the complete year are not yet available, it appears that the total of chemical exports aggregated close to $178,000,000 in value —16% greater than in '36, 23% over '35, and 66% higher than for the year '33.

A gratifying feature, and one that is becoming more pronounced from year to year, is the prominent part that new or relatively new products are playing in our exports of chemicals and related products, states C. C. Concannon, chief of the Chemical Division, Bureau of Foreign & Domestic Commerce. Gases of various kinds; several new paint and varnish products; chemical specialties used in the leather, textile, and other fields; new medicinals, pharmaceuticals, biologics, and toiletries—these and many other products, some of which are too new to export trade to be classified separately in our trade returns, are going forward regularly in a score of foreign markets, according to Mr. Concannon.

October Imports 5% Above Last Year

Imports of chemicals, drying oils, and related products were recorded at $16,-052,000 in October, a figure approximately the same as for the preceding month, but 5% above that recorded for October last year Although receipts of such products continue heavy, the tendency has been easier since March of the current year during which imports were recorded at $23,118,400 to establish a 6-year record.

Exports in October at 7½-Year Peak

Keeping pace with our general export trade, which reached the highest figure recorded in 7½ years in October, exports of chemicals and related products advanced in value to $16,664,000 in that month compared with $14,512,000 in September and $13,942,000 in October, '36. Practically every leading item in our chemical and related product export trade, except naval stores, and fertilizer materials, increased substantially in October compared with the corresponding month of last year.

Export shipments of chemical specialties, a classification including a wide line of high grade manufactured products, were recorded at $2,458,700 during the month against $1,065,000 in October, '36. In this group shipments of insecticides and disinfectants increased from 3,195,000 lbs. to 5,692,000 lbs. and plastic products from 1,407,000 lbs. to 1,816,000 lbs.

Foreign demand for industrial chemicals also advanced sharply in October to $2,567,500 from $1,989,000. In this group exports of sodium compounds increased from 50½ million lbs. to 57 million.

Trade in paints and paint materials, particularly the latter, continued active during the month with exports reaching the value of $1,992,000 compared with $1,561,000 in October, '36. Shipments of carbon black increased from 13½ million lbs. to 18 million lbs.; and mineral earth pigments from 3 million to 5 million lbs.; but exports of ready mixed paints, varnishes, and lacquers declined from 370,000 gals. to 215,600 gals.

German Output Up

Germany's chemical industry continues to forge ahead with many units working at capacity and some setting new records of production, according to reports reaching the Commerce Dept.'s Chemical Division from the office of the American Consulate General, Frankfort-on-Main.

Based upon fuel consumption, the index of national chemical manufacturing activity stood at 107.6 in June 1937 (1928 equals 100) compared with 87.0 for June 1936. Although official data for later months are not yet available, there is every indication that production continued to advance throughout the third quarter.

Exports of chemical products likewise continued to record large increases with the exportation of 3,270,800 metric tons valued at 605,400,000 marks in the first 9 months of the year against 2,521,500 tons valued at 498,000,000 marks in the corresponding months of 1936.

Jap Industry Analyzed

No individual financial group actually dominates or controls the Japanese chemical industry, according to a comprehensive study made by Assistant Commercial Attache Paul Steintorf, Tokyo, and released by the chemical division of the Dept. of Commerce. At present there are at least 8 important groups actively engaged in the production of Japan's basic chemicals, but direct control over the output of basic chemicals by these groups accounts for not more than 75% of the total, leaving a substantial portion under the control of numerous small independent companies.

Report also finds that, contrary to popular belief, the great Japanese family group does not dominate or control the chemical industry of that country. The Mitsui and Sumitomo interests play very important roles, but a number of newer financial groups are equally prominent.

Packaging Machinery Makers

5th annual meeting of the Packaging Machinery Manufacturers Institute was held Dec. 9, at the Garden City Hotel, Garden City, Long Island, N. Y. Following officers were re-elected: H. H. Leonard, president (vice-president, Consolidated Packaging Machinery Corp., Buffalo); vice-presidents: Wallace D. Kimball, 1st vice-president, Standard-Knapp Corp., and Morehead Patterson, vice-president, American Machine and Foundry Co.; secretary-treasurer, H. L. Stratton.

Semi-annual dinner meeting of the Institute will be held on Tuesday evening, March 22d, at the Palmer House, Chicago, on the opening day of the Packaging Exposition.

Phila. Christmas Party

Third Annual Christmas party of the Chemical Club of Philadelphia was held at the Walton on Dec. 23, with a record attendance of 88 members and guests.

President Lloyd announced that at the next meeting in January, a new set of officers would be elected, and to this end appointed the following nominating committee, with instructions to report a list of candidates at that time: W. H. Davis, Harshaw Chemical, Wm. J. Thorn, Innis, Speiden & Co., and Robert J. Burns, Raymer Pharmacal.

A Successful Party

All previous attendance records were shattered at the Christmas party of the Salesmen's Association of the American Chemical Industry held at the Hotel Pennsylvania on Dec. 28. Members and guests are still praising "Bart" Sheehan, du Pont, and chairman of the entertainment committee, for the very excellent dinner and the outstanding floor show. Nearly 300 were in attendance, including a large number of the industry's most important executives. The former attendance record was 265 in '36.

New officers of the Association for '38 are:—President, Charles E. Kelly, Hagerty Brothers & Co.; vice-president, Joseph M. Wafer, Industrial Chemical Sales Division of West Virginia Pulp & Paper; treasurer, D. W. Thompson, Mathieson Alkali; secretary, Ray H. Giebel, Harshaw Chemical. The following members were elected to the executive committee for three years:—Francis J. McDonough, president, N. Y. Quinine; Elmer H. Hessler, G. S. Stoddard & Co.

Silver Jubilee Meeting

The Compressed Gas Manufacturers' Association will hold its 25th annual meeting at the Waldorf-Astoria, N. Y. City, Jan. 17 and 18. Franklin R. Fetherston is secretary-treasurer of the association, the office of which is located at 11 W. 42d st., N. Y. City.

Acetic Anhydride

. . . once an expensive "fine" chemical . . . now a low-priced "heavy-tonnage" chemical through improved methods of synthesis

A new method of synthetic production developed by Carbide and Carbon Chemicals Corporation has steadily reduced the price of Acetic Anhydride. Today, it can be purchased for a fraction of what it cost twenty years ago. At the lowest price in its history, Acetic Anhydride now joins the ranks of "heavy-tonnage" chemicals and warrants reinvestigation for new uses.

Acetic Anhydride is used wherever a powerful acetylation agent is needed, particularly for reaction with the alcohol groups found in cellulose, vegetable oils, phenols and sugars. Now it should also be tried in reactions which are difficult to carry out with weaker reagents, such as in the acetylation of secondary aromatic amines or in the preparation of diacetyl derivatives of primary amines.

Since it reacts with water, Acetic Anhydride should be investigated in reactions where water removal is desired, as in nitrations and sulphonations, or in the reduction of oximes and nitro compounds. In the acetylation of hygroscopic compounds, such as choline, which must be protected from moisture, the use of Acetic Anhydride is especially necessary.

You should investigate the possibilities of Acetic Anhydride at its new low price. Carbide and Carbon Chemicals Corporation will be pleased to consult with you.

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PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

Honored by France

In recognition of his work as a member of the National Petroleum War Service Committee, the Order of Commander of the Legion of Honor was conferred recently upon W. S. Farish, president of Standard Oil Co. (N.J.) by President Le Brun of France.

In New Positions

Dr. J. F. Adams, vice-chairman of the Crop Protection Institute at Purdue, resigns his position with the Delaware Agricultural Experiment Station to accept the position of manager of the Agricultural Chemical Division of General Chemical with headquarters in N. Y. City. . . Dr. F. J. Schneiderhan, who for the past 8 years has served as associate plant pathologist of the West Virginia Agricultural Experiment Station, resigns to become director of field research with Chipman Chemical, Bound Brook, N. J. . . M. H. Corbin is now on the technical sales development staff of Standard Varnish. He was formerly with Arco Co., Cleveland, in charge of that company's research.

DR. F. J. SCHNEIDERHAN

O. D. Bluthardt is now sales manager for R. B. H. Lacquer Base Co., Bound Brook, N. J. He was formerly manager of the company's western branch. . . Ralph M. Bennett is now president, Billings-Chapin, Cleveland paint company, succeeding the late Nathaniel D. Chapin. Mr. Bennett was with S. W. for over 20 years prior to his going with Billings-Chapin.

R. Kronenberg, for 8 years with Chemical Solvents, Inc., N. Y. City, is now on the N. Y. Metropolitan sales staff of Shell Union Oil. . . John H. Clark, Jr., former assistant sales manager of T. Shriver & Co., Harrison, N. J., is now sales manager, succeeding the late Robert E. Perry. Company manufactures filter presses. . . Ralph C. Champlin has been elected a vice-president of the Ethyl Export Corp. He is chairman of the coordinating committee of the Ethyl organization.

Exposition a Success

A shrill blast of a whistle, a spontaneous, deep-throated cheer from exhausted exhibitors and the 16th Exposition of Chemical Industries, in several respects one of the most unique in the series, became history at 6.01 p.m., Saturday, Dec. 11. Largely planned during a boom in business, it was by far the most elaborate, yet it was held in the midst of a recession, depression, lull in business (the reader to take his choice). Optimisim, however, not pessimism was everywhere in evidence. Exhibitors, at first quite doubtful of concrete results, soon caught the fever of enthusiasm from the visitors. As a result both actual business placed and the number of inquiries received were satisfactory, and in some cases, of record proportions. While final attendance figures have not been disclosed by the management, the aisles and booths were crowded day and night. Very favorable comment was heard on all sides on the type of visitors and the absence of the droves of "sightseers" of former expositions.

Quite likely no two of the thousands who entered the Grand Central Palace came with the same purpose or were interested in exactly the same things so that it is impossible to give those who did not attend an adequate word picture of what was outstanding. Where the working model of a Dorr tray thickener for multiple thickening and washing, the 80-ton tabletting machine of F. J. Stokes Machine Co., or the new glass wool fibre of less than half the diameter of a human hair, might easily be the focal points of attention for many chemical engineers, the laboratory chemists might find the relatively simple, but highly unique Phosphomonoesterase Test (Scharer Method) for the control of pasteurization of milk and cream, or the new Cameron pH recorder for continuous process control or recording of pH, the most interesting exhibits.

The 327 "New Chemicals of Commerce" —products developed by the advertisers in Chemical Industries and the Chemical Buyer's Guidebook since the '35 exposition attracted widespread attention (complete description appeared in the December issue of C. I., p589).

Atlas 25 Years Young

Atlas Powder (2,700 employees) went to a party on Dec. 14. It was the 25th anniversary of the company and 14 celebrations were held simultaneously from the Atlantic to the Pacific Coast. By a special hook-up President Leland Lyon spoke to all groups of the history and accomplishments of Atlas. To those who had been with the firm for a quarter of a century, gold watches were distributed —45 in Wilmington and 92 at other dinner meetings. A surprise feature was Graham McNamee, noted radio announcer.

OBITUARIES

Dr. Sanja Schwabacher, 46, president, S. Schwabacher & Co., importer of Russian mineral oil, N. Y. City, died in his office on Dec. 11 from a heart attack. He was educated in Geneva and Berlin and received a doctorate of laws from Heidelberg in '13. He entered the banking field in Hamburg and in '21 came to the U. S. as representative for Oelwerke Julius Schindler, Hamburg oil refiners, a concern headed by his brother-in law, Julius Schindler. In 1925 Dr. Schwabacher established the firm that bore his name, acting as representatives for the Schindler interests. His widow, a son and a daughter survive.

DR. S. SCHWABACHER

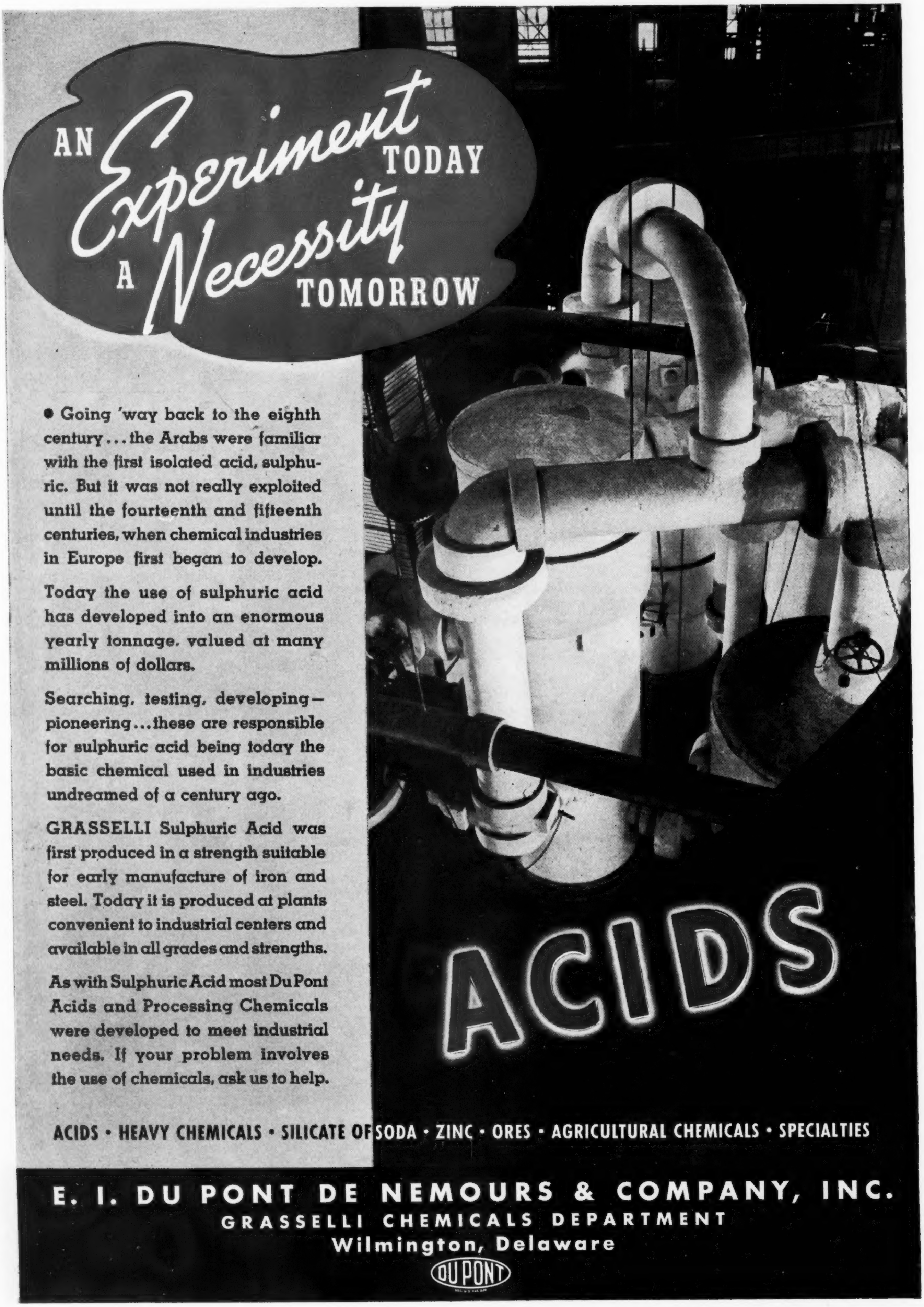
The business of S. Schwabacher & Co. will be continued under the direction of Gustav Schindler, who is expected to arrive from Hamburg late in January. He is the son of Julius Schindler, of Oelwerke Julius Schindler, which the Schwabacher firm represents in the U. S.

William Byron Foster

William Byron Foster, 63, advisory director, du Pont, died of a heart attack on Dec. 21. He joined the du Pont organization in '02 as a draftsman and worked his way up through the organization. One of his daughters is the wife of Lammot du Pont, Jr.

Joseph Clark Baldwin

Joseph Clark Baldwin, Jr., 66, president, United Dyewood, died Dec. 29 from an attack of pneumonia at his home in Mount Kisco, N. Y. He began his business career with Dodge & Olcott, N. Y. City essential oils house, in 1893. Soon after he became affiliated with the N. Y. & Boston Dyewood Co., of which his father was president and a director. When American Dyewood was organized in 1905, Mr. Baldwin's father retired, and the son continued as vice-president and treasurer of the new concern. Subsequently United Dyewood, a holding company, was formed and Mr. Baldwin became treasurer and later president. He was also president of the Compagnie Haitienne.


AN Experiment TODAY
A Necessity TOMORROW
• Going 'way back to the eighth century... the Arabs were familiar with the first isolated acid, sulphuric. But it was not really exploited until the fourteenth and fifteenth centuries, when chemical industries in Europe first began to develop.
Today the use of sulphuric acid has developed into an enormous yearly tonnage, valued at many millions of dollars.
Searching, testing, developing—pioneering...these are responsible for sulphuric acid being today the basic chemical used in industries undreamed of a century ago.
GRASSELLI Sulphuric Acid was first produced in a strength suitable for early manufacture of iron and steel. Today it is produced at plants convenient to industrial centers and available in all grades and strengths.
As with Sulphuric Acid most Du Pont Acids and Processing Chemicals were developed to meet industrial needs. If your problem involves the use of chemicals, ask us to help.
ACIDS
ACIDS • HEAVY CHEMICALS • SILICATE OF SODA • ZINC • ORES • AGRICULTURAL CHEMICALS • SPECIALTIES
E. I. DU PONT DE NEMOURS & COMPANY, INC.
GRASSELLI CHEMICALS DEPARTMENT
Wilmington, Delaware
DU PONT

N.A.I.D.M. Meeting Has Record Attendance

Specifications Approved on Disinfectants, Insecticides for Submission to National Bureau of Standards—Brenn, Huntington Laboratories, Elected President—Packaging Competition Opens—Turner & Co. Represents Penn. Refining—Haas-Miller Expands—Second Purdue Conference—

The 24th annual meeting of the National Association of Insecticide & Disinfectant Manufacturers, held Dec. 6th and 7th, at the Hotel Biltmore in N. Y. City, broke all former attendance records with over 250 registrations. Establishment of commercial standards for household disinfectants and insecticides was the principal subject debated. After much labor on the part of the committee in charge, specifications were drawn up, and in some cases after amendments were offered, standards were voted on. These will be offered to the National Bureau of Standards for further action.

The following are the specifications for 4 common types of disinfectants.

Emulsified coal-tar disinfectants, cresylic disinfectants and pine oil disinfectants are judged on the basis of their relative disinfectant value. The relative efficiency of these three types of disinfectants should be expressed in terms of "phenol coefficient" determined in accordance with the official method of the Food and Drug Administration, U. S. Department of Agriculture, as specified in circular 198. With the hypochlorite type of products, the disinfectant power should be judged on the basis of the content of available chlorine as determined by the standard methods of chemical analysis. The phenol coefficient of a given product indicates its relative disinfectant power as compared with that of phenol (the typhoid germ being used as the test-organism). The disinfectant power of phenol (carbolic acid) is taken as the figure one (1), and the product in question may be so many times stronger or weaker than phenol. (Thus, a phenol coefficient of 2 indicates twice the disinfectant power of carbolic acid.)

Hypochlorite Disinfectants. The germicidal value of these products depends upon the amount of available chlorine. Commercial products are readily obtainable with an available chlorine content from 2½ to 7½%. The percentage desired by the buyer should be named in this specification.

Emulsified Coal-tar Disinfectants. This type of disinfectant is readily obtainable from many reliable producers, with phenol coefficients ranging anywhere from 2 and 20. The phenol coefficient desired should be named by the buyer.

Cresylic Disinfectants. This type of product is available with phenol coefficients of from 2 to 5.

Pine Oil Disinfectants. Products made under this specification from good quality pine oil should have a coefficient of 3 to 4.

Dr. Alfred Weed, John Powell & Co., N. Y. City, headed a discussion on specifications for liquid household spray insecticide. The specification, which was originally offered at the 1936 meeting, with a few changes, was submitted also to the National Bureau of Standards for approval. The changes included the substitution of "official test insecticide," in place of "official control insecticide," and the establishing of grades AA-excellent-plus 16; A-good-plus 6 to plus 15; B-equal to official test insecticide, minus 5 or plus 5.

Change Mid-Year Meeting

The association voted to hold the mid-year meeting at Lake Wauwausee, Ind., and approved the suggestion of J. L. Brenn to make the mid-year meeting a three-day affair. The mid-year meeting is scheduled for June 13-14-15. J. L. Brenn, who was elected president of the association, is a graduate of Valparaiso University, receiving his B.S. in chemistry degree in 1909. In 1911 he became affiliated with West Disinfectant, and 6 years later he resigned to become affiliated with Sanitary Specialties, Chicago. In 1919 he founded the Huntington Laboratories.

Additional Officers Elected

Other officers elected were: William J. Zick, Stanco, Inc., as first vice-president; Wallace Thomas, Gulf Refining, as second vice-president; John Powell, John Powell & Co., as treasurer; John H. Wright, John H. Wright Co., as honorary secretary; Mrs. E. D. Sullivan, executive secretary.

Omaha Next

National Pest Control Association has announced that the 6th Annual Convention will be held at Hotel Fontennelli, Omaha, Neb., Oct. 24 to 26.

Distributing Specialties

Joseph Turner & Co., Ridgefield, N. J., has become sole selling agent for the specialty products of Pennsylvania Refining, Butler, Pa., in New York State, the Metropolitan N. Y. area, and Northern New Jersey. Products include white oils and petrolatum, and the company's odorless insecticide base oil, "Insecti-Sol." Stocks of Pennsylvania Refining products will be carried at the Joseph Turner plant at Ridgefield, N. J. Sales for the territory will be in charge of P. J. LoBue of the Turner organization.

Federal Trade Commission

United Laboratories, Inc., Euclid Ave. at Ivanhoe St., Cleveland, distributing plastic rock flooring, roofing material, water-proofing and damp-proofing materials, and paints and varnishes, stipulates that it will cease advertising to the effect that the respondent corporation is a group of laboratories organized and equipped to test, approve and certify every type of maintenance product that is produced; that it has a force of 300 men or employs a "board of consulting engineers" whose duty is to pass on various alleged tests; that tests have been made by, or that its personnel has been connected with, United Laboratories, Inc., over a long period of time, or that the respondent corporation is a maintenance research organization whose recommendations are unbiased, when such are not the facts.

Use of certain unfair methods of competition, in violation of Section 5 of the Federal Trade Commission Act, is alleged by the Commission in a complaint issued against Lawrence A. Huffman and Plant Energy, Inc., 71 6th st., Logansport, Ind., engaged in the manufacture and sale of compounds for use in stimulating the growth of legume and non-legume plants. Huffman, president, Plant Energy, traded as Plant N-R-G Co. prior to July '36.

Nathan R. Stern, 6619 Denison ave., Cleveland, trading as Western Reserve Laboratories, has entered into a stipulation with Commission to discontinue certain misrepresentations in connection with the interstate sale of a product to be used as a household cleaning agent and as a windshield cleaner.

Under a stipulation F. C. Foard & Co., Inc., Bridgeport, Conn., will discontinue certain misleading representations of its product, a soot remover and flue cleaner called "Imp."

'38 Wolf Awards

Personnel of the jury of award and details of the 7th competition for the Irwin D. Wolf awards for distinctive merit in packaging have been announced by the American Management Association, sponsoring organization. Competition opened Dec. 15 and will close on Feb. 9, with all packages entered to be displayed at the 8th Packaging Exposition, Palmer House, Chicago, March 22 to 25.

Jury of awards includes: Richard F. Bach, Metropolitan Museum of Art; James C. Boudreau, School of Fine and Applied Arts, Pratt Institute; I. A. Hirschmann, vice president, Saks-Fifth Avenue; Alice Hughes, *New York Journal*; Edgar Kobak, vice president, Lord & Thomas; C. B. Larrabee, Printers' Ink Publications; Ray M. Schmitz, General Foods Sales Co., Inc.; Dorothy Shaver, vice president, Lord & Taylor, and William Weintraub of *Esquire*.

Packaging Council Plans

Preliminary plans have been formulated by the Packaging Council of the American Management Association for a more intensive and broader discussion of current packaging, packing and shipping problems. The Conference program will tackle four major subjects: the unit package; packaging machinery; shipping and shipping containers; and bulk packaging.

Subjects and speakers for the unit package sessions, which will be held on Tuesday and Wednesday, March 22 and 23, are now being developed by a committee of the Packaging Council.

The packaging machinery program will be held on Tuesday, March 22. Program details are in the hands of a committee of which H. H. Leonard, vice president of the Consolidated Packaging Machinery Corp., is chairman.

Two days—March 23 and 24—will be devoted to shipping and shipping containers. The committee in charge of this division, headed by Albert W. Luhrs, president of the Container Testing Laboratories, acting in conjunction with J. H. Macleod, vice-president of Hinde & Dauch Paper, has already drafted a program and tentatively selected speakers. Bulk packaging sessions will be held on Friday, March 25. Chairman of the committee developing this program is R. W. Lahey, American Cyanamid.

More than 95% of all available exhibit space in the 8th Packaging Exposition had been leased by Dec. 15, it is announced by the association, which adds that all indications are that space will be exhausted before Jan. 15.

Paint Merger

Paint division of the Larkin Co., Buffalo, has been merged with the Carpenter-Morton Co., Boston. Merger became effective Dec. 21. J. Crate Larkin will become a director of Carpenter-Morton which will have executive control of the new organization.

Haas-Miller Expands

Haas-Miller Corp., manufacturer of industrial chemicals, specialties, oils, and greases, Philadelphia, reports it has taken over the entire business of Chas. J. Haas, Inc. Company announces also the recent appointment of R. K. Gurney, well known throughout the trade, as New England sales manager.

Lower Soap Prices

As a result of lower raw material prices, P. & G. has reduced the price of several major brands of soap 5% to 7½%. New prices include the entire Ivory family, Kirks' castile and Selox. Camay, Oxidol and Chipso will remain unchanged for the time being.

2nd Purdue Conference

The second annual conference of pest control operators will be held at Purdue University, Lafayette, Ind., Jan. 17 to 21. Conference will be directed by Prof. J. J. Davis, of Purdue, under the auspices of the National Pest Control Association with the cooperation of a number of noted entomologists.

Glycerin Makers Elect

Francis A. Countway, president of Lever Brothers, is the new president of the Association of American Soap and Glycerine Producers, succeeding S. Bayard Colgate, president of Colgate-Palmolive-Peet, who was named vice-president for the Eastern states.

Following officers were re-elected: R. R. Reupree, P. & G., vice-president for Central States; F. H. Merrill, Los Angeles Soap, vice-president for Western States; N. S. Dahl, John T. Stanley Co., treasurer; A. Roy Robson, assistant treasurer, and Roscoe C. Edlund, secretary.

In New Addresses

Several important firms in the chemical specialty field are in new locations. Churchill Manufacturing is now located in Galesburg, Ill. Former location was in Sioux City. Silverstone Chemical has moved from 5555 Pershing ave., St. Louis, to larger quarters at 5673 Waterman st. Unico Products, N. Y. City, is in larger quarters at 519 Hudson st.

Cadmium Price Changes

The Grasselli Chemicals Division of du Pont announced on Dec. 20 several important price changes on cadmium products. Cadmium anodes in any quantities are now $1.35 per lb.; cadmium oxide in 25 or 50 lb. lots, $1.35 per lb.; cadmium hydrate in 50 lbs. or over, $1.35; Cadalyte (cadmium plating salt) in 50 lb. lots, 65c per lb. All prices are f.o.b. destination, terms 30 days net.

$50 for a Title

Charles F. Opitz, president, John Opitz, Inc., Long Island City, is offering a prize of $50 for the most suitable and descriptive name for the present title of "exterminator." Award will be made at the second Purdue Conference for pest control operators, Jan. 17-21.

Deaths of the Month

Floyd S. Sturgeon, 49, vice-president and sales manager, Dodge Chemical, Boston, died on Dec. 10 after a long illness. He was connected with the company for over 20 years. Walter I. Willis, 55, former vice-president of the Three-in-One Oil Corp., died Dec. 10 after an illness of three weeks. Mrs. Edna S. Bullock, 50, wife and business partner of Arthur R. Bullock of the Col-Chem Co., Elizabeth, N. J., died of pneumonia on Dec. 28.

Specialty Company News

Cole Chemical Co., Long Island City, N. Y., specialty manufacturer, has opened a New England branch at 83 Watertown ave., Wollaston, Mass., on the outskirts of Boston. D. Stuart Pope is manager of the new branch. The Cole firm recently moved to a larger plant in Long Island City.

Creative Chemical Co., Pittsburgh, has issued a folder describing "Watertone," a compound for softening water.

The Geo. B. Robbins Disinfectant Co., 53-54 Long Wharf, Boston, Mass.—Guy P. Robbins, president—has been elected to active membership in the N.A.I.D.M.

An extensive campaign in one syndicated newspaper weekly magazine, the magazine section of a New York newspaper and a Boston paper and 20 national magazines with a total circulation of 18,000,000 will be run in 1938 for Larvex mothproofing fluid.

Standard Adhesives Products Co. has opened a plant at Passaic, N. J. The eastern plant of the company was formerly located at Harrison. Other factories are at Chicago and Los Angeles.

The Celotex Corp. is buying a substantial interest in Certain-teed Products.

The Bennett Chemical Co. has been incorporated and will operate a plant at Hagaman, N. Y., near Amsterdam. Company will make a wide variety of household and industrial chemical specialties.

E. F. Houghton & Co., Philadelphia, distributed a bonus last month of one week's wages to employees earning less than $2,500 annually who have been with the company more than 5 years. A half week's salary went to employees with the company less than 5 years.

Specialty Briefs

Du Pont makes farthest northern shipment of Zerone (anti-freeze) when 600 gals. went to Iceland. . . James A. Branegan, Kali Manufacturing, Philadelphia, spoke on formaldehyde at Albright College, Reading, Pa., Dec. 14. . . A $40,000 blaze destroyed part of Edgewood Chemical plant at Jacksonville on Nov. 25. . . Interstate Chemical, Jersey City, had a slight fire Dec. 10. . . Several employees of Melrose Chemical, Providence, were overcome by fumes Nov. 29 and one man lost an arm when caught in machinery. . . William C. Parrott, head of Parrott Chemical, Stamford, Conn., was fined $130 on Nov. 22 in Federal Court in New Haven on two charges of misbranding and adulterating insecticides. . . Hockwald Chemical (soaps, disinfectants) moved Dec. 1 into larger San Francisco headquarters at 111 Mississippi st. . . C. E. Wartman, sales manager, Sta-Brite Products, moves his headquarters to main office in New Haven from New York.

Heavy Chemicals

Industrial Chemical Shipments Decline Sharply

Buyers Slow to Sign Contracts—Acetic Reduced When Lime Is Reduced 30c—Chromic Acid Advanced ½c—Tin Salts Lowered—Saltpetre Priced 50c Higher—Bearish Outlook in Most Consuming Fields—Inventories at Low Levels—

Shipments of industrial chemicals into consuming channels in December reflected very strikingly the state of manufacturing operations in chemical and chemical consuming industries. With very little incentive to do otherwise (except in a relatively few instances where higher prices were announced for '38) buyers deliberately scheduled deliveries so as to close out the year with extremely small inventories.

Considerable hesitancy has developed on the part of buyers towards signing contracts. As a result, the contract season is dragging well into the New Year, in direct contrast to the situation a year previously. But after all this condition always prevails when uncertainties abound, and the precipitous decline in manufacturing operations in the final two months of '37 has shaken confidence in the immediate outlook for the first quarter of '38. Any improvement in the economic and political outlook would alter the set-up at once. The very fact that inventories are small would accelerate the closing of contracts and increase materially the demand for spot deliveries and shipments against existing contracts.

A number of important price revisions were announced last month. Outstanding was the further decline in acetic. Acetate of lime factors dropped a "bombshell" into the situation by announcing a drastic cut of 30c per 100 lbs., bringing the market down to $1.65. Competition then developed in acetic, and although the acetate of lime clause was to be dropped in '38 the acid makers finally reduced quotations to a point in line with lime. Acetic acid contracts are being written without the acetate of lime clause, however, and whether the acid producers will meet additional changes in lime remains to be seen. Buyers will be in a favorable position over the first quarter should lime go higher for any reason.

Most of the other changes on the downward side were the direct result of weakness in the metals. The tin salts declined during the month, lead acetate was reduced 1c, and monohydrated copper sulfate declined ¼c. The International Tin Committee has lowered the export quota for the cartel member countries to 70% of the standard for the first quarter, as against 110%. The news gave a bullish tone to tin for a short-lived period and then further declines were made. Copper, zinc, and lead statistics for November were all bearish in that they indicated rises in stocks. The softness in the metals over the past few months has been particularly pronounced and many keen observers insist that the metals have largely discounted adverse news and that a reversal in the price trend could come quickly with constructive news. Yet many analysts are very reluctant to take a positive market stand.

Chromic acid has been advanced ½c to a basis of 15¼c. Such a move was expected by the trade in view of the higher price for bichromate of soda. Prices for barium chloride have been advanced $5 a ton in all zones, bringing the new levels in Zone 1 to $77 in bags and $79 in barrels. The saltpetre '38 schedule shows a 50c advance in all grades, and potassium perchlorate is ½c higher. Potassium titanium oxalate has been advanced 1c.

Immediate outlook in the large chemical consuming industries is a bearish one. Automotive production has slumped badly, and it is reported that the used-car market is flooded. However, early estimates place '38 production at 4,000,000 units, as against almost 5,000,000 in '37, but if this goal is reached it will require a more than fair amount of industrial and plating chemicals. Paper production has been curtailed, particularly newsprint. Encouraging, however, is the fact that November shipments exceeded production by 37,170 tons, so that the inventory position is somewhat improved. Prices on several grades of pulp have been reduced for the first quarter of '38, restoring the approximate levels that prevailed in the third quarter of '37. This move is expected to increase operations. Bleached sulfite pulp is now priced at $60, as against $70; unbleached sulfite at $50, against $57; and soda pulp at $58, against $65 per ton. No changes were made in sulfate pulps or imported pulps.

Trade authorities in the textile field are growing more confident that activity in the more important divisions will expand moderately in the first quarter.

The average weekly consumption of scoured apparel wool in November was the lowest for that month in more than 20 years. Consumption averaged 2,651,000 lbs., scoured, weekly, as against 3,319,000 in October, and a weekly average of 4,964,000 lbs. for the first 11 months of the year. Deliveries of silk totaled 31,749 bales, compared with 36,002 bales in October, and an 11-months-of-'37 monthly average delivery of 36,600 bales.

Momentarily it is impossible to even guess as to the tonnages of chemicals for the first quarter. Inventories in nearly all lines are extremely small. The answer is hidden in the political, economic, and foreign news and developments over the next few weeks.

Important Price Changes

ADVANCED

	Dec. 31	Nov. 30
Acid chromic	$0.15¼	$0.14¾
Barium chloride, bbls.	79.00	74.00
Potassium perchlorate	.09½	.09
Potassium titanium oxalate	.34	.33
Saltpetre, gran.	.06½	.06
Crystal	.07½	.07
Powdered	.07½	.07

DECLINED

	Dec. 31	Nov. 30
Acid acetic 28%	$2.23	$2.38
Antimony, metal	.14	.14¾
Calcium acetate	1.65	1.95
Copper sulfate, monohydrated	.09¼	.09½
Glycerin, dynamite	.15½	.19½
Saponification	.11	.14½
Soap lye	.10	.13
Lead acetate	.11	.12
Sodium stannate	.28	.28½
Tin crystals	.33	.34
Tin metal	.41	.41¾
Tin oxide	.48	.50
Tin tetrachloride	.21	.21¼
Zinc metal, E. St. Louis	5.00	5.25

News of the Companies

Industrial Rayon is working on plans for a new plant for cut staple rayon to be located at either Painesville, Ohio, or Covington, Va. . . Scobell Chemical, Rochester, gave a week's pay as a Christmas bonus. . . Stauffer Chemical is again taking steps to end alleged odors, soot and smoke at its Chauncy, N. Y. factory, although spokesman for the company claims there are no grounds for complaints. . . Mathieson Alkali will complete an $800,000 addition to its Lake Charles plant by the end of '38. . . Freeport Sulphur is spending $307,795 for additions to its Freeport, La., plant. . . This sulfur producer has taken out 1,100,000 tons of sulfur at the Grande Ecaille salt dome since operations were started 4 years ago. President Langbourne M. Williams reports that this area is now accounting for about 14% of the total U. S. elemental sulfur production. . . West Pacific Co., Inc., (of N. Y.), 27 William st., has been organized as sole selling agents for West Pacific Co. (of Nevada), producers of potash and soda products, sulfur, sulfuric acid, aluminum oxide, and aluminum sulfate. Mitchel I. Liebenson, president, is in charge of the N. Y. office

2nd Best Sulfur Year

For producers of sulfur '37 was the second best year in their history. Shipments exceeded 2,400,000 tons, according to preliminary estimates, which was 22% more than the total for '36 and was 99.3% of the amount shipped in the peak year of '29, which was 2,437,238 tons.

Limited Buying of Coal-tar Chemicals

Crude Creosote Advanced—Coal-tar Solution Quoted Higher—Coking Operations Decline for 3d Consecutive Month—Japan In Need of Benzol—Cresylic Quoted Unchanged for First Quarter—Blues Most Popular Spring Shades—Dinitrochlorbenzene Reduced 2c—

Very little spot business was reported in the market for coal tar chemicals in the past month and shipments against existing contracts were well below the November total. Most of the activity centered around the negotiating of '38 contracts. In most quarters considerable progress was reported, in sharp contrast with certain other divisions of the chemical field. Most consumers adopted a strict hand-to-mouth purchasing policy in view of the business situation and the approach of the holiday and inventory period.

Price revisions were few. Crude creosote oil was revised upward to a basis of 13½c-14½c. Coal-tar solution in tanks was raised to .122c-.132c per gal., while water soluble methyl violet was reduced 10c. A 2c reduction in dinitrochlorbenzene was posted for '38 business, bringing the new level to 14c.

Business in benzol remains spotty. An acute shortage of the chemical is reported in Japan and import permits for substantial quantities have been issued by the Japanese Finance Ministry. Naphthalene is dull. Little business for crude has been placed recently, but this situation is expected to change shortly when refiners enter their heavy season of production. Demand for phenol holds up remarkably well, with most of the tonnage going to the plastics field.

The tight situation in deliveries of phthalic anhydride which was so pronounced in the spring and early summer of '37 no longer exists, due to the increase in manufacturing capacities and the decline in demand, but the price structure remains firm and unchanged.

Most of the intermediates are being offered at unchanged price levels including alphanaphthol, aniline, benzidine base, betanaphthol, dinitrotoluene, nitrobenzene, paratoluidine, and Schaeffer's salt. Most of the coal-tar acids are also being offered at unchanged prices for the first half of '38.

Coking Operations Off

The sharp decline in steel activity is having pronounced effect in coking operations and in the supply of crude coal tar. For three consecutive months the output of coke has shown a decline from the preceding month. Production of byproduct coke in November totaled 3,225,556 tons, a decrease of 17.4% from the October figure. Practically all of the decrease occurred at furnace plants. Light oil output in November was 13,308,574 gals., as compared with 16,653,769 in October, and 16,715,913 gals. in November of '36. Total for the first 11 months of '37 amounted to 192,861,157 gals., against 166,083,012 in the same period of the previous year. November tar production was 40,520,295 gals., as compared with 50,705,294 in October, and 50,894,498 gals., in November of '36. Total for the first 11 months was 587,188,264 gals., against 505,668,552 in the same period of '36.

Benzol production in November amounted to 7,472,000 gals., against 9,610,000 in October, and 9,633,000 in November of '36. Total for the first 11 months was 110,674,000 gals., as compared with 94,710,000 gals. in the same period of the previous year.

Coatings Producers Slack

Demand for the principal coal tar solvents was restricted by the let-down in the automotive field with the consequent decline in operations in the coatings industries. The call for supplies from the rubber centers was likewise very poor. Crude rubber consumption in November was 33,984 tons, the lowest monthly figure since October, 1934, and compares unfavorably with 38,707 tons in October, and 50,433 tons in November of '36. Producers of benzol, toluol, xylol, and solvent naphtha are soliciting contracts on a 6-months basis at prices unchanged from those prevailing in the final quarter of '37.

Domestic Cresylic Unchanged

Domestic suppliers of cresylic acid are booking contracts for 6 months without price change, but importers were reported to have cut quotations 2c a gal. A somewhat better demand for dyes was noted in the final two weeks of '37, indicating that seasonal influences were at work in textiles and leather. Most of the business booked called for deliveries of dyes after the turn of the year which should shortly be reflected in an improved consumption of intermediates.

Colors for Spring

Blues will lead in Spring fashions. Navy is singled out as the predominant volume color in Spring silk dresses. Next to navy, women's preferences in silk dresses will run to black, blues other than navy, beiges, rose, copper and lilac. Colors for wool dresses listed for consumer acceptance comprise blues, beiges, tans, black, violet tones, gold and green.

Coal-tar Chemicals

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
Coal-tar solution, tks.	$0.122	$0.118
DECLINED		
Dinitrochlorbenzene	$0.14	$0.16

News of the Companies

First step in the movement to force industries in the Raritan valley to cease polluting the Raritan River with factory wastes was taken Dec. 14 when the N. J. State Board of Health directed Calco Chemical to meet certain specifications designed to eliminate pollution. . . Ciba opens an office at Columbus, Ga., with H. P. Faust in charge. . . Because of the enthusiasm aroused by its movie, "Beyond the Rainbow," Calco commissions Marius Hubert-Robert to make an oil painting of Victoria Falls, Africa, for the annual calendar. Those who have seen the movie will remember that one scene shows a beautiful rainbow with these magnificent falls in the background.

Trial of the lawsuit of the Newport Chemical Co. against the U. S. Government for a refund of $384,634 in income taxes, plus 20 years' interest, was begun Dec. 7 before Federal Judge F. A. Geiger in Milwaukee. Amount with interest now exceeds $800,000.

Du Pont Gains Dye Patent

The U. S. District Court for the District of Columbia has handed down a decision authorizing issuance of a patent to du Pont to cover a new sulfur dye, based upon a joint application of George Barnhart and Herbert A. Lubs.

New dye is a recent contribution to the manufacture of sulfur colors, termed by one of the inventors as "an art, rather than a science." It is in the form of hard, shiny flakes or grains, and is substantially free from defects which have afflicted the sulfur dye industry, such as spontaneous combustion, insolubility, swift deterioration, shifting of shade, dustiness and tendency to be blown through the air, and tendering of the fibers to which it is applied. The invention has met with considerable commercial success, the testimony at the trial showing that the sales by the du Pont Co. have already amounted to millions of lbs. per year.

Patent application was rejected by the Board of Appeals of the Patent Office, following which the du Pont Co. filed a bill in equity in the U. S. District Court against the Commissioner of Patents to obtain a patent for this invention.

Fine Chemicals

Tartaric Acid Reduced ½¢ to 24¼¢ Basis

Poor Demand for Fine Chemicals—Slight Seasonal Improvement in a Few Items—Glycerin Reduced 4c With Heavy Stock Accumulations—Alcohol Steady—Competition in Aromatics—Mercury Weak—Menthol Lower—Merck Starts Retirement Income Plan—

The price structure for fine chemicals and pharmaceuticals remains remarkably firm in the face of exceptionally light demand for most items. A slight seasonal improvement was noted in the final weeks of December for a few products, but by far and large the volume of business is greatly below that of December '36. With buying greatly reduced in the final quarter of '37, it is expected that inventories have been reduced radically and that renewed interest will manifest itself in the first few weeks of January.

Tartaric acid was reduced ½c in the middle of December to a basis of 24¼c for 10,000 lbs., one delivery. Weakness in tartaric did not spread to the other tartars. Quicksilver declined still further and closed the year at $81.00 per flask. No revision of the price structure for mercurials took place, producers taking the position that the spread is not sufficiently great. Yet, consumers are watching the trend in mercury closely in the belief that additional price reductions in the metal will force lower quotations for mercurials.

Severe competition was in back of a 5c reduction in Agar No. 1 and 10c in Agar No. 2. Natural menthol is getting stiffer competition from domestically produced synthetic material. A 25c reduction was announced in synthetic, bringing the current level to $3.00 per lb., while two declines in natural brought quotations to $3.15.

Weakness in Glycerin

Additional accumulations of glycerin stocks caused a further weakness in the price structure for that item and a 4c slash in C. P. was placed in effect in December. Market is now 15½c in drums, carlots, lowest price since July, '36. Earlier in '37 refined glycerin sold as high as 29½c and users in many instances found a great deal of difficulty in obtaining adequate supplies and were forced to pay premiums for material. The new and lower schedule on refined glycerin covers deliveries up to the middle of '38 with the usual price protection clause.

A steady market prevails in alcohol. Much depends upon the sale of anti-freeze over the next two or three months. While demand has been light for bismuth metal and salts and cadmium metal and its salts the price structure continues, in both instances, to be characterized by extreme firmness. Immediate demand for quinine is light, but a heavier movement is expected in the first weeks of January.

Hydrogen peroxide, 100 volume material, is now quoted on a basis of 19½c-20c for deliveries east of the Mississippi. No change was made in the 21c quotation for shipments west of the Mississippi, nor were any price revisions reported for U.S.P. material.

With sales curtailed because of present business conditions, competition between the producers of aromatic chemicals has become more pronounced in certain items. The more important products for which lower quotations were reported included phenylacetic acid, benzyl alcohol, citral, diphenyl oxide, geraniol, linalyl acetate, methylheptenone, and terpinyl acetate. Some shading was also reported in methyl acetophenone and phenylacetaldehyde.

Personalities in the News

Michael Lemmermeyer, Aromatic Products' president, was operated on recently for an appendix condition. He had just completed a 7-weeks business trip through the Middle West. . . Dr. Ernest Guenther, chief research chemist, Fritzsche Brothers, arrived recently in the *Bremen* from an extensive European trip. . . John H. Montgomery, former assistant secretary of Fritzsche, has been elected a member of the board of directors and secretary of the company to fill vacancies occasioned by the recent death of A. D. Armstrong. . . Erich Rathje, of the Heyden Chemical sales division, has returned from a 3-months trip to Europe. Unsettlement in the Far East forced him to cancel his projected trip there.

ERICH RATHJE

Charles O. Homan, who has been with Dodge & Olcott (N. Y. City essential oils and aromatics house) for 30 years, is the new sales manager. . .Percy C. Magnus, president, Magnus, Mabee & Reynard (essential oils and aromatics) has been reelected president of the N. Y. Board of Trade.

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
None.		
DECLINED		
Acid phenylacetic	$1.85	$2.00
Acid, tartaric, U. S. P.	.24¼	.24¾
Agar No. 1	1.05	1.10
Alcohol, benzyl, drs.	.61	.63
Arecoline hydrobromide	4.35	4.75
Atropine sulfate	2.80	2.85
Citral	1.60	1.70
Diphenyl oxide	.55	.60
Ethyl iodide	4.85	5.55
Glycerin, C. P.	.15½	.19½
Menthol	3.15	3.20
Mercury	81.00	83.00
Methylheptenone	2.45	2.50
Terpinyl acetate	.77	.80

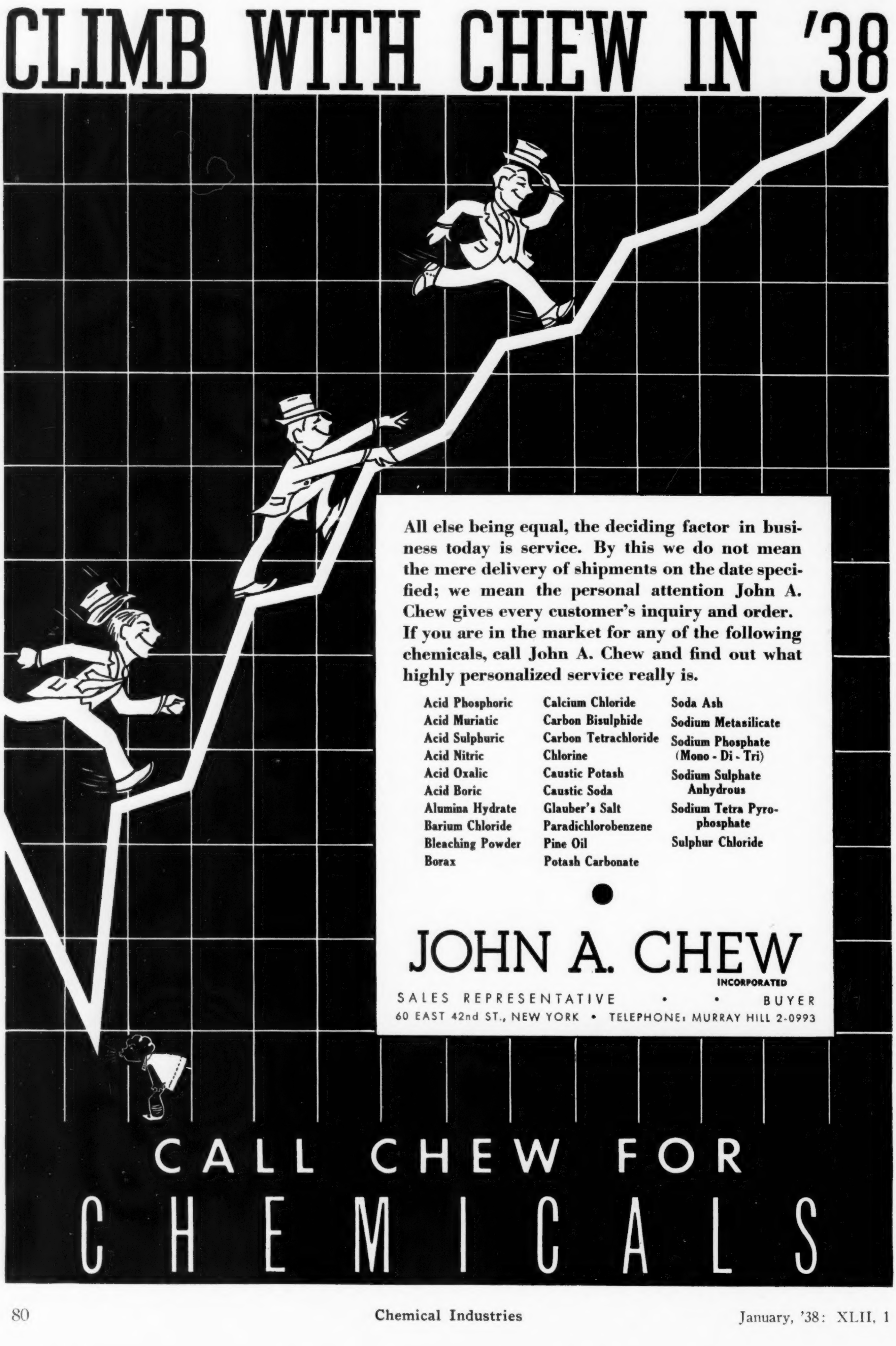
Merck Retirement Income Plan

Merck, effective Jan. 1, placed in effect a plan for retirement income for its 1,500 employees, combining the insurance benefits of the Federal Social Security Act with participation in company profits. In accordance with this plan, directors at the December meeting, in voting a dividend of a dollar a share on the common, also voted $75,000 to be utilized in the supplemental retirement income plan.

The Merck plan divides itself into two parts: Part I. Future Service Retirement Income: pertains to retirement income for services of employees rendered after Dec. 30, 1937; to the cost of this retirement income the Company contributes on an equal basis with the employee. The joint contributions provide for the purchase of certain benefits from a leading life insurance company which is now providing life insurance for employees under a group life insurance contract. Part II. Supplemental Retirement Income: pertains to supplemental benefits which the company hopes to provide from time to time without cost to the employee. Such benefits are not guaranteed, but depend upon future dividend payments by the Company, which of course depend on future earnings.

In making this additional protection available to employees, the Company intends to continue its policy with respect to the existing sick benefit plan and holiday and vacation pay plan. The published provisions of the group life insurance plan now in effect will be continued.

Entire cost of the supplemental retirement income will be borne by Merck. Each year in which dividends in excess of one dollar per share are paid on common stock a sum per share equal to one-third of the amount by which such dividends exceed one dollar per share will be appropriated.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All else being equal, the deciding factor in business today is service. By this we do not mean the mere delivery of shipments on the date specified; we mean the personal attention John A. Chew gives every customer's inquiry and order. If you are in the market for any of the following chemicals, call John A. Chew and find out what highly personalized service really is.
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Calcium Chloride
Carbon Bisulphide
Carbon Tetrachloride
Chlorine
Caustic Potash
Caustic Soda
Glauber's Salt
Paradichlorobenzene
Pine Oil
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Curtailed Activity in Coatings and Rubber Industries—Petroleum Solvents Offered at Unchanged Levels—Ethyl Acetate, Isopropyl Acetate Reduced 1c—Denaturing Grade Methanol Declines Further—Ethyl Alcohol Production Up 13% in Fiscal Year Ended June 30—

Interest in the petroleum solvents markets centered last month in the negotiation of '38 contracts at prices and terms similar to those prevailing at the year-end. December tonnages were to say the least disappointing, particularly those moving into the large industrial fields. Coatings manufacturers have been forced to make several adjustments of their manufacturing schedules in the face of the swift curtailment of operations by the automotive producers. In the Akron tire area, too, consumption of solvents has dropped to an extremely low point. In the Mid-West a fair demand was noted for material by the dry-cleaning industry, but in the East dullness was everywhere in evidence.

Only one price change was reported in December. The tankcar quotation for petroleum thinners in New Jersey was lowered ½c per gal. and the tankwagon price was reduced a full cent in the first week of the month. This weakness did not spread to other areas or other petroleum solvents and as the year ended the price structure presented a firm appearance.

Weakness in ethyl acetate and isopropyl acetate became more pronounced and a 1c reduction was announced for both products late in the month. Price schedules for ethyl acetate for the first quarter are based on 5½c in tanks and 6½c in drums, carlots, and similar quotations prevail for isopropyl acetate for the first 90 days of '38. Little change has taken place in the competitive position of acetone, but no further reductions were reported in the month just closed. Quotations on butyl alcohol, butyl acetate, and the phthalates remain firm and unchanged.

Another reduction was made in denaturing grade methanol, this one a 2c decline. The market is now 30c a gal. in tanks, and 36c in drums, carlots, for deliveries east of the Rockies. Prices on the Pacific Coast are 4c a gal. over these prices. Pure, as well as other grades of natural held firmly, as also did synthetic material.

One important reason for the poor tonnages of solvents has been the greatly restricted production schedules of the tire manufacturers. Shipments of casings in the third quarter amounted to 13,590,949 units, as compared with 16,324,381 in the second quarter and 14,557,480 in the third quarter of '36. Yet, shipments for the first 9 months of '37 amounted to 44,582,251, against 42,032,069 in the corresponding period of '36, indicating quite clearly that manufacturing operations have tumbled precipitously from the high rate of activity of the first 6 months of 1937. Several reasons have been advanced to explain this condition. In the first place, fearing serious labor troubles, tire manufacturers raised production levels early in '37 abnormally in an effort to accumulate large inventories. These are still much higher than they should be and the slump in automotive production has seriously curtailed sales. Also, tire manufacturers are in the midst of a program of decentralization of manufacturing operations. It is the opinion in the trade that production in the final quarter of '37 was well below the 10,000,000 mark because of these adverse factors.

Alcohol, Methanol Production

Production of ethyl alcohol increased by more than 13% in the 1937 fiscal year ending June 30 (A detailed report will be found in the Statistical Data Section of this issue). November production of completely denatured amounted to 4,127,664 wine gals., as compared with 5,556,990 in November of '36. Total removed amounted in November to 4,266,603 wine gals., as compared with 5,954,154 in November of the previous year. Stocks were much lower at the close of the month, the comparative figures being 564,669 and 838,433, respectively. November production of specially denatured totaled 5,481,866 wine gals., as against 7,059,574, while the removed totals were 5,693,010 and 7,024,378 respectively. Stocks on Nov. 30 amounted to 554,777, as compared with 472,484 on Nov. 30, 1936.

November crude methanol production compares unfavorably with the corresponding month of '36. Total crude production amounted to 423,315, as compared with 423,792 in October, and 520,722 in November of '36. Synthetic amounted to 3,562,372 in November, as compared with 3,532,091 in October, and 3,417,755 in November of the previous year. Improvement in synthetic is largely due to increased use of methanol as an anti-freeze.

The National Labor Relations Board ordered a collective bargaining election among employees of the Shell Chemical Co. plant at Shell Point, Contra Costa County, Calif., on Dec. 13, stating that balloting must be completed by Dec. 24.

Important Price Changes

	Dec. 31	Nov. 30
ADVANCED		
None.		
DECLINED		
Ethyl acetate, tks.	\$0.05½	\$0.06½
Drs.	.06½	.07½
Isopropyl acetate, drs.	.06½	.07½
Tks.	.05½	.06½
Methanol, denat. grade:		
Drs.	.36	.38
Tks.	.30	.32

Freight Rate Decision

Speeding forward at an unprecedented rate, the I.C.C. now appears likely to rule on or before March 1 on the latest appeal of the carriers for authority to increase basic freight rates by 15%. Although it flatly refused a supplemental plea by the railroads for immediate rate boosts on Dec. 10, it was apparent that the commission is impressed with the testimony of representatives of the carriers that they are suffering heavy losses. On Dec. 6 the Commission overruled a motion submitted by 6 states seeking to throw out the road's petition for a general increase.

Further impetus was given on Dec. 10 when President Roosevelt in a White House press conference asked for speedy determination of the rate problem by the I.C.C. to maintain the solvency of the railroads of the country.

The President made it plain that the Administration is giving no consideration to Government operation of the roads or to further general financing of carrier operations.

Necessary to permanent solution of the railroads' problem, he said, are reorganizations, consolidations and the surrender of uneconomic trackage, traffic from which can be turned over to bus and truck transportation.

Final hearing of testimony will start Jan. 17. As soon as this is completed, closing oral arguments will be heard. A revised schedule of regional hearings, slated to take place somewhat before final hearings begin in Washington, was also announced.

In New Quarters

The American Distilling Co., distributors for Kessler Chemical, moves its N. Y. offices to 239 11th ave. New telephone is BRyant 9-1841. . . Standard Alcohol is now at 26 Broadway, N. Y. City, and the new telephone is DIgby 4-2220. Company was formerly at 2 Park ave.

CRYSTAL PHOSPHATE

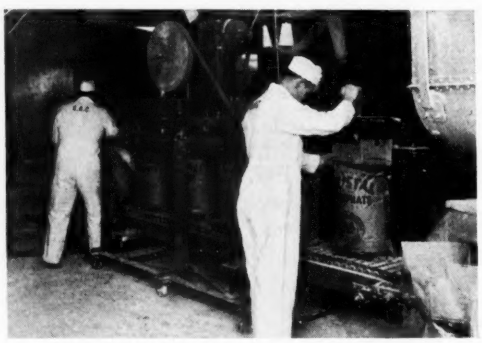
SWITCHES TO PAPER BAGS

The American Agricultural Chemical Co., one of this country's most progressive concerns, has adopted the Bagpak Multiwall Paper Bag for Crystal Mono Calcium Phosphate.

The chemical company's packaging experts filled and stored Bagpak bags under all sorts of unfavorable conditions, made less than carload shipments all over the country, and even dropped filled bags off the roof of their plant, before entrusting their high quality product to a paper bag.

Here are some additional features that sold The American Agricultural Chemical Company on Bagpak bags:

(1) Locked tight with patented "Cushion Stitch"—the more you pull the tighter it gets—and sealed at both ends. Moisture, and dirt can't get in.



Model D-1 Bagpaker at The American Agricultural Chemical Co. plant at Carteret, New Jersey

(2) Specially designed construction gives many times the tensile strength required.

(3) Easy to open.

(4) Instant identification of the product assured by distinctive printing design which shows up to a maximum advantage on paper.

There is a Bagpak Bag for your product. Why not investigate and benefit from the economy and many other advantages of these improved containers.

Bagpak's engineering and development staffs are available to you without obligation.

"One-man package... easy to handle"

Trade Mark reg. U. S. Pat. Off.

BAGPAK INC

220 EAST 42nd ST. NEW YORK CITY

Agricultural Chemicals

Dullness Continues in Fertilizer Markets

Further Weakness in Organic Ammoniates—Fear Sulfate Shortage Next Spring—Decline in Fertilizer Sales in '38 Expected—Confusion Exists Over Farm Bill—November Tag Sales Total 123,465 Tons—

Markets for raw fertilizer materials in December continued to be all but lifeless. Buyers and sellers alike are utterly confused on the outlook and in such a situation it is not surprising that trading has fallen to an extremely low state. Interest of the industry is largely centered on the farm bill which passed the House and the Senate in different forms at the special session and which is now in conference. Some doubt exists that the differences can be "ironed out" speedily.

The organic ammoniates are woefully weak and fresh declines in several took place in November. This situation is in sharp contrast with the conditions prevailing in January of '37 when organic ammoniates averaged a dollar per unit higher than they are at the moment.

Considerable fear exists that a serious squeeze may occur later in sulfate. The Bureau of Mines estimate of by-product ammonia production in November was down 20% from October, the sharpest month to month decline on record. The November output, expressed in ammonium sulfate was only 50,234 tons, the smallest monthly total since February of '36. With steel activity down to 20% of capacity many mills are completely shut down. This has forced sulfate producers to make shipments, in some instances, from plants far distant from the point of delivery. There does exist in fertilizer circles, however, the feeling that steel production will expand in the first quarter, but how much no one knows, hence the uncertainty.

The Baltimore fish scrap market is dull. A small tonnage of unground menhaden scrap was reported available at $4 and 10c per unit-ton, basis factory. Fishing operations have virtually ended. Jap sardine meal is quoted at $46 for shipment, but spot stocks were said to be available at $45 to $45.50 per ton.

Any attempt at forecasting the year '38 in the fertilizer industry is futile. Yet it seems almost certain, despite the fact that the farmers' income is up about a billion dollars, that fertilizer producers are facing the probability of a reduction in tonnage sales as compared with '37.

November Tag Sales Better

Sales of fertilizer tax tags in November were above the corresponding month of last year, following declines in September and October. Aggregate sales in 17 reporting states totaled 123,465 tons, representing gains of 24% over November, 1936, and 43% over November of '35. Five of the 12 Southern states reported larger sales this year than last, but most of the total gain was accounted for by Florida. In past years November sales were only slightly more than 2% of the total year's sales in the South, and were much less important in the Midwest.

November tag sales of 123,465 tons compares with 99,916 in November of '36, and 86,379 in November of '35. Sales in the 12 Southern states in the January-November period totaled 5,127,145 tons, as compared with 4,132,634 in the corresponding period in '36, a gain of 24%.

Fertilizer Export, Import Figures

Exports of fertilizers and fertilizer materials in October totaled 200,182 short tons with a value of $1,736,048, as compared with 194,237 tons in October of '36, an increase of 3.1% in tonnage, and a decline of 11.9% in value. Principal changes in comparison with the previous year included declines in exports of synthetic sodium nitrate and potash, and increases in ammonium sulfate, land pebble rock, and superphosphate. In the first 10 months of '37 exports totaled 1,384,196 short tons, a decline of 15.3% from the 1,634,847 tons exported in the previous year, but 3.4% ahead of the corresponding period of '35 when the total was 1,338,173 tons. Most classes of material were exported in smaller volume in '37 than in '36, with particularly sharp declines in ammonium sulfate, phosphate rock, and potash.

Totaling 174,719 short tons valued at $3,801,164, October imports were 6.6% under October '36 in tonnage and 2.6% under in value. Substantially smaller imports of ammonium sulfate and nitrate of soda were largely responsible for the decline as compared with October of '36. Upward trend in potash imports continued, with about twice as much muriate and kainite brought in as a year earlier. Phosphate imports also increased in October. Imports for the January-October period were the largest reported in several years, being 33.1% larger than in the same period of the year previous. In the nitrogen group a decline in ammonium sulfate was more than offset by a large increase in sodium nitrate. Potash salts and phosphatic materials were imported in much larger quantity in the first 10 months of '37 than in the corresponding period of '36.

Frank H. Totman, vice-president, Summers Fertilizer, Baltimore, is recovering from double pneumonia at Union Memorial Hospital, Baltimore.

Important Price Changes

ADVANCED

	Dec. 31	Nov. 30
None.		

DECLINED

	Dec. 31	Nov. 30
Nitrogenous material:		
Imported	$2.55	$2.70
Eastern Points	2.50	2.80
Sardine meal, Jap	45.50	46.00
Tankage imported	3.25	3.35

Fertilizer Company News

Swift and V.-C. will distribute sulfate of ammonia produced by Jones & Laughlin. Latter company is constructing a sulfate bagging plant at Memphis. . .A $300,000 fire destroyed the fertilizer plant of the Aroostook Federation of Farmers at Caribou, Me., on Dec. 10. It will be rebuilt. . .Josey Fertilizer, Dunn, N. C., has been chartered with an authorized capitalization of $500,000. . .Smith-Douglas will construct a $200,000 sulfuric plant close to its Norfolk factory. . .One of the largest farmer-owned fertilizer plants in the world has been opened at Portlock, Va. . .The New York Stock Exchange has approved Davison Chemical's application to list 633,388 shares of common. . . Etiwan Fertilizer will open a branch at Greenwood, S. C. . .Two warehouses of the Charles W. Priddy Co. at Portsmouth, Va., were destroyed by fire on Dec. 24. . . Gulf Fertilizer, Tampa, joins the N.F.A.

Deaths Reported

John R. Young, 89, president, J. R. Young Fertilizer, Norfolk, and an active member of the industry for 40 years, on Nov. 30. . . R. E. Montgomery, general manager, Palestine Oil Mill & Fertilizer, Palestine, Tex., on Dec. 24.

Freight Rate Increases

The I.C.C. on Dec. 18 refused to suspend freight rate increases announced by the carriers on fertilizers and fertilizer materials under the Commission's decision in Ex Parte 115. These rates were filed to become effective Dec. 20 and include all rates on fertilizer and fertilizer materials within C.F.A. territory; from, to, and within Southwestern territory; and from, to, and within Western Trunk Line territory. In addition, rail rates on sulfur, limestone, and cottonseed meal in all territories are increased. All these increases are in addition to any increase which may be granted by the I.C.C. in Ex Parte 123, the 15% increase case now before the commission. Should the latter be granted, the cumulative increase in the above mentioned territories will be over 30%.

Chinawood Priced Slightly Higher

Less Resale Material Available—Coconut, Corn and Crude Menhaden Advanced—Weakness in Animal Oils and Fats—Abundant Supplies of All Fats and Oils Reported by Bureau of Agricultural Economics—

Trading in fats and oils in December was unfavorably influenced by many outside factors, such as the decline in the security markets, the poor reports on the state of current business, the uncertainties in the politico-economic picture, the special session of Congress, etc. The net result was that buying was of a very conservative nature with little interest in futures.

Despite very light demand an advance was made in Chinawood. This was forced because of greater uncertainty on how future supplies will be gotten through the ever-tightening ring that Japan is forging about Chinese shipping points. Further, consumers who were in a mood to turn part of their holdings into cash have largely disposed of such quantities that they feel they can safely do without and are now much more reluctant to resell. Perilla and oiticica strengthened in the final week of the month in sympathy with the advance in Chinawood, but the ground lost earlier was too great and both showed net losses when end-of-the-month comparisons were made.

Coconut oil quotations locally were up somewhat from the close in November. Little buying was reported but consumers are watching developments in the Far East very closely. Corn had a steadier tone despite little active trading. Crude and refined fish oils were firm and a rather sharp rise was noted in crude menhaden. Lower levels were reached in linseed, peanut, and soybean.

Weakness was most pronounced in the animal oils and fats. Quotations on oleo oil were reduced rather sharply. No. 1 closed in December at 10½c, as against 12½c on Nov. 30.

The situation with respect to fats and oils promises abundant supplies for this season, the Bureau of Agricultural Economics reported on Dec. 15. Cottonseed oil should be available in large supply. World production of cotton for the 1937-38 season is expected to be about 38,500,000 bales. This is a fourth larger than the record world production of the previous season and a third larger than the 5-year average 1928-32.

Production of flaxseed from the small 1937 crop is still estimated at 7,634,000 bu. compared with 5,908,000 in '36 and 14,520,000 in '35. Crushings of domestic and imported flaxseed for the first quarter of the 1937-38 season were the largest for that quarter of any year since '29. Total beef fat supplies for consumption next year may be nearly as large as in 1937; fewer cattle will be slaughtered but they will run heavier in weight than last year. Reports from the Philippines indicate plentiful supplies of copra and coconut oil.

Knight Reports to Wallace

Finding new and wider industrial uses for farm products, byproducts, and surpluses is one of the objects of research in the Bureau of Chemistry and Soils, according to Dr. Henry G. Knight, Chief of that Bureau, in his annual report to Secretary Wallace of the Dept. of Agriculture. Report relates work accomplished in the manufacture of sweet potato starch, in improvement of sorgo and sugar-cane syrups, study of waste hemlock bark as a source of tannin, and study on production on a semi-commercial scale of sodium chlorate, which is used as a weed killer. States the report:

"Sodium chlorate, a weed killer the farmer is now paying from 9 to 10c a lb. in small lots and 6.25c a lb. in carload lots, can be produced at 4.9c a lb. This figure includes 5% interest on investment, but does not include sales and promotion costs and corporation taxes. The estimate is based on results obtained at the semi-commercial sodium chlorate plant operated by the Bureau of Chemistry and Soils in collaboration with the Bureau of Plant Industry. During the past year about 7,000 lbs. of the herbicide were produced at the plant and shipped to agricultural experiment stations for use in field studies on the control of noxious weeds."

Senn Expands Facilities

George Senn, manufacturers' agent, Philadelphia Bourse, Philadelphia, Pa., has constructed new bulk storage facilities for tankwagon delivery of benzol, xylol, toluol and naphtha. He is also now equipped to make tankwagon deliveries of turpentine. He represents in the greater Philadelphia territory the Neville Co., and also Taylor, Lowenstein, Mobile, Ala., prominent naval stores company.

Oil Trades Meeting Jan. 25

The Oil Trades Association of N. Y. will hold its quarterly meeting Jan. 25 at the Waldorf-Astoria. Dinner will be served at 7 p.m. and will be followed by a vaudeville show.

Booklet on Aromatics

Givaudan-Delawanna, Inc., 80 5th ave., N. Y. City, has issued a new catalog, designed to serve as a guide in the purchase and use of aromatics.

Fats and Oils

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
Chinawood, tks.	\$0.15½	\$0.14½
Coconut, tks.	.04⅛	.04
Corn, crude, tks.	.06⅝	.06½
Menhaden, crude, tks.	.37½	.34
DECLINED		
Lard oil, ed. prime	\$0.12¾	\$0.14
Lard, city	8.75	9.50
Linseed, raw, tks.	.096	.098
Oleo, No. 1	.10½	.12½
Oiticica, drs.	.12¾	.14
Peanut, crude, tks.	.06⅝	.07
Perilla, tks.	.11	.11½
Soybean, crude, tks.	.06	.07
Stearine, oleo	.07	.08½
Tallow, acidless, tks.	.09	.09¼

Whittlesey Honored

President George A. Martin, Sherwin-Williams, was host at a dinner Dec. 14 at the Hotel Cleveland, Cleveland, Ohio, to a capacity crowd of the company's directors, officers, executives, department heads, long service employees and invited guests. Occasion was in honor of the completion of 50 years continuous service of the company's first vice-president, H. D. Whittlesey, and the completion of 25 years continuous service of 14 other employees. Of this latter group, 7 are from Cleveland, 4 from Newark, N. J., and 3 from Chicago, all having reached the 25 mark sometime during this year.

Personalities in the News

Silas W. Pickering, an official of Carbide, has been chosen to head the Charleston, W. Va., City Planning Commission... E. V. O'Daniel, Cyanamid vice-president, sailed early in January for a 5-weeks' trip abroad... Edgar Sengier, managing director, Union Miniere du Haut-Katanga (Katanga Copper) sailed for Belgium in the *Normandie* on Dec. 26... William W. Buffum, treasurer and general manager of the Chemical Foundation, has been elected to honorary membership in the American Institute of Chemists... George Roeder, consulting chemist of Rahway, N. J., has moved to South America... Miss Frances M. Suarez, advertising manager for Philadelphia Quartz, has been elected secretary of the Philadelphia chapter of the National Industrial Advertisers Association... Carleton Ellis was granted his 700th patent on Dec. 14.

Government Aid?

Four regional research laboratories to develop chemical byproducts and new uses for agricultural products are provided in a senate amendment to the general farm crop control bill now pending in conference committee. Amendment was offered by Sen. Theodore G. Bilbo of Mississippi.

Carbon Black Reaches 2½¢ Level

Worst Price War in the Chemical Field in 10 Years—All Lead Pigments Reduced—Ultramarine Blues Advanced 1c —December Tonnages of Raw Materials Disappointing— November Paint Sales Below Corresponding Month of '36—

Pigments and Fillers

The "battle royal" among the producers of carbon black reached a climax last month and the most serious and costly fight in the chemical field in 10 years continues unabated. Prices have been carried down to an all-time low and whether further reductions will be made is still anyone's guess. The former low record was 2.72c in force during the depth of the depression. The latest quotation is 2½c for tankcars. All producers agree that current levels are well-below production costs and this fact may put an end to the knock-down-and-drag-out fight that has had the industry in a turmoil for nearly two months and will over the next year result in millions of dollars of losses to the factors involved.

One producer has insisted upon a differential of ¼c between tankcars and bags. The others have been just as insistent that no such differential should exist. When the latter met the 2¾c tankcar quotation with a similar price in bags the fifth price slash of the current battle was announced on Dec. 14 and the 2½c basis on tanks was reached. But the bag quotation remained at 2¾c until Jan. 1 when it was reduced to 2½c. Quotations on special grades have remained unchanged throughout the prolonged price fight. Export prices have not been affected. Export prices for the first quarter are unchanged from '37 quotations.

A number of other price revisions were announced in December, a few on the upward side, but the majority being declines from former levels. Fresh weakness in lead brought lower quotations on red lead, litharge, and orange mineral. The sharp reduction in glycerin was reflected in a ½c decline in spot ester gum quotations to a basis of 9c in carlots, but producers had not indicated at the close of the month what their position would be on prices for the first quarter of 1938. The fall in lead prices was also responsible for a 1c reduction in lead titanate. Further softness appeared in the casein market and a ½c decline was made in an effort to move out accumulating stocks.

White lead corroders began late in the month to solicit business for the first quarter of '38 at the lower levels established on Nov. 30, but from reports in the trade consumers were showing little immediate interest. Stearate producers also are soliciting 90 day contracts without price changes from those which have been in force for months. Substantial declines have occurred in several of the important varnish gums. Cables from primary sources indicated lower replacement costs on a number of Congo gums and dammars. Importers reduced quotations accordingly.

Additional Price Changes

All grades of ultramarine blues have been marked up 1c per lb. Chrome green oxide has been advanced 1c to a basis of 22c. Lithol Rubin Toner was one of the few colors offered at reduced prices, a 15c drop bringing the new level to $1.35 per lb. Another was the yellow oxides. Contracts on synthetic material for '38 (subject to adjustment at the end of 6 months) were offered the trade at a ½c decline. In barrels the price is 6½c in carlots, and 6¾c in l.c.l. quantities.

Included in the colors unchanged in price for '38 are: chrome yellow, chrome green, iron blues, para lithol and toluidine toners. These are all offered by suppliers with a quarterly adjustment clause. The precipitated iron oxides are also unchanged, the prices on black and brown oxides are subject to adjustment in June, while the red oxides are offered on a quarterly basis. Earth color factors are offering contracts for '38 on all products under the same prices and terms that were in force in '37.

Prices for domestic clay have been raised 50c a ton for '38. A similar increase was placed in effect at the beginning of 1937. As reported briefly in the December issue a ¼c reduction in 35% leaded zinc oxide and a ⅝c decline in 50% material has placed both grades on a 6c basis in bags in carlots delivered, except on the Pacific Coast where the prices are ex-warehouse. These prices are only firm through the end of March when they are subject to a possible quarterly adjustment. Suppliers of both lithopone and titanium pigments (other than lead titanate) are busy soliciting contracts on the same prices and terms as prevailed in '37.

Alkali blue toner, scarlet ink toner, methyl violet toner, and lake red c toner (pulp) are all unchanged for '38 with the usual quarterly adjustment clause included. No alteration in the price structures for graphite, talc, or Tripoli have been reported.

December tonnages of raw paint materials were extremely disappointing to the trade. The volume was well below the figure for December of 1936. Paint manufacturers are moving very slowly in the matter of signing contracts for their requirements in view of the uncertainties and because most of them had accumulated considerable inventory when the price structure was on the upward trend.

Important Price Changes

	Dec. 31	Nov. 30
ADVANCED		
Blue, Ultramarine:		
Dry	$0.11	$0.10
Regular	.16	.15
Special	.19	.18
Pulp No. 1	.27	.26
Chrome oxide greens	.22	.21
DECLINED		
Carbon Black, bgs.	$0.0320	$0.0405
Casein, 20-30	.11	.12
80-100	.11½	.12½
Lead titanate	.11	.12
Lead Metal, N. Y.	4.75	5.00
Lead White	.06¾	.07⅛
Basic sulfate	.06¼	.07
Litharge	.06¼	.06½
Orange mineral	.10¼	.10¾
Red lead, 95%	.07¼	.07½
97%	.07½	.07¾
98%	.07¾	.08

November Paint Sales Down

November paint sales as reported by the Bureau of the Census, reflects the slowing up in building and renovations and dropped below the total for November '36. November '37 total for 680 establishments amounted to $26,105,315, as against $29,488,620 in the corresponding month of the previous year. Sales, however, for the first 11 months of '37 were ahead of the same months of '36 by a rather wide margin, the figures being $388,755,254 and $367,538,406 respectively. Since the total '36 sales were only $398,032,770, the volume of sales in '37 will compare very favorably, despite the slump in the last quarter.

Trade sales of paint, varnish and lacquer by 580 establishments in November totaled $12,790,654, as compared with $13,894,427 in November of '36. Industrial sales amounted to $10,889,719, as compared with $13,182,544. Paint and varnish industrial sales slumped in November, as compared with the same month in '36, the respective totals being $7,169,000 and $8,829,357. Industrial lacquer sales also showed a loss, $3,720,719, as against $4,353,187 In. all cases, however, the 11-months figures were greater in '37.

Paint Exports Up

October U. S. exports of paints, pigments and varnishes aggregated $1,993,000 in value, a figure that has been exceeded only twice in recent years. Exports of such products during the preceding month were recorded at $1,638,000, and in October '36 figure was a little over $1,561,000.

Analysis indicates that the gain in October over the same month of last year was due in large part to heavier shipments of pigments.

Natural Raw Materials

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
Sumac, Italian, grd.	$62.00	$61.00
DECLINED		
Corn Sugar, tanners'	$3.15	$3.30
Corn syrup 42°	3.11	3.26
43°	3.16	3.31
Dextrin, corn	3.50	3.55
British Gum	3.75	3.90
Mangrove bark	25.00	26.50
Starch, pearl	2.93	3.08
Powdered	3.03	3.18
Wax, bees:		
Yellow African	.25	.25½
Brazilian, Chilean	.27	.29½
Wax Candelilla	.13½	.14
Wax, Carnauba:		
No. 1 Yellow	.42	.44
No. 2 Yellow	.41	.43
No. 3 Chalky	.33	.34½
No. 3 N. C.	.34	.35½
Wax, Japan	.10¼	.10¾
Wattle bark	39.75	41.75
Zinc dust	.0740	.0765

Room For Expansion

S. B. Penick & Co., N. Y. City, has acquired a 10-acre plot and over 100,000 sq. ft. of floor space at Lyndhurst, N. J., as part of its new extensive expansion program. Property was formerly occupied by the United Cork Co.

Project is well under way and when alterations have been made and manufacturing equipment has been installed the manufacture of all extracts, alkaloids, insecticides, and other products will be concentrated at Lyndhurst.

Concentration of manufacturing operations on the new location is the first step in a broad program. Within a short time company will announce relocation of its main plant. It was, in fact, the necessity of relocating its botanical drug division that caused the company to program a broad development of its facilities. Fire on Sept. 15 wiped out all but one of the Weehawken, N. J., buildings that housed a substantial part of the eastern activities of the botanical drug division. The first step in the program has been realized at Lyndhurst. The second will be the relocation of its main plant.

S. B. Penick & Co. maintain warehouses and milling facilities in Chicago, has collection and plant facilities at Asheville, N. C., and possesses warehouses at Roan Mountain, Tenn.

Revises Set-Up

General Naval Stores Co., a wholly owned subsidiary of Newport Industries, Inc., has ceased business activities. All its assets and liabilities have been transferred to Newport Industries and the business will be continued under the name of the General Naval Stores Division of Newport Industries. There has been no change in personnel.

Starch, Dextrin In Further Declines

Light Trading Features December Markets for Natural Raw Materials—Japan Wax More Competitive—Important Varnish Gums Reduced in Primary Markets—Shellac Quiet—Mixed Price Movement in Naval Stores—Penick to Open New Plant at Lyndhurst—

The markets for most natural raw materials were in the doldrums in the final month of the year. The dullness which characterized the markets in industrial chemicals was of even greater proportions in gums, waxes, tanstuffs, shellac, etc., for the very excellent reason that consumers were holding comparatively larger inventories of raw materials. A greater incentive existed in the first half of '37 to accumulate surpluses of natural raw materials for prices on most items in this classification were soaring and appeared to be headed for even higher levels before the close of 1937. When the turn came consumers naturally fell back on stocks on hand and were uninterested in fresh commitments.

Corn derivatives were again weak and new low price levels were reached for corn starch, dextrin, corn syrup, and tanner's corn sugar. A better export demand for corn is in evidence and is lending some support to the price structure that would otherwise not exist.

Natural tanstuffs were generally easier in tone with demand extremely light. Tanning operations have for several months been well below the rate existing in the first half of '37. There is reason to believe that inventories in consumer hands are no longer excessive and any upturn in production may stiffen prices. Sumac has been very firm; mangrove bark and wattle bark were marked down in December; some weakness developed in the final week of the month in myrobalans and J1 was quoted at $30 per ton, J2 at $22.50, and R2 held steady and unchanged at $22. In all cases the tanning extracts were firm in face of light demand.

Price Shading in Waxes

Dullness was quite apparent in the wax markets and easier prices were reported in certain grades of beeswax. With trading inactive in candelilla a little price shading was in evidence, largely on the part of resellers. A more competitive condition now exists in Japan and quotations gravitated down from 10¾c to 10¼c for fairly large quantities. Considerable uncertainty exists on Carnauba. At the moment consumers are out of the market except for small spot lots. The political developments in Brazil of the past 60 days are likely to have some effect but as yet this cannot be defined. There is talk in the trade of additional difficulties with exchange, proposed taxes, control of exports, etc., and the lack of explanatory cables makes it quite impossible to report intelligently on the matter as yet.

Easier Tone at Primary Sources

The gum market was largely featured by cables from primary sources offering a wide variety of items at lower figures. In the final week of Dec. 15 grades of Congo gum were reduced. In the week previous several copals and dammars were lowered. Reductions included No. 1 and No. 2 Singapore dammar; pale bold scraped East India; pale Singapore E. I. nubs; pale Macassar nubs; Macassar chips; Batu scraped bold; and split Pontianak nubs. From the trade it appeared that the reductions failed to excite buyers unduly and that the hand-to-mouth buying policy remains unchanged.

Little Interest in Shellac

Shellac markets were without outstanding market developments in December. Consumers failed to show much interest, limiting actual buying to immediate requirements only. The domestic and international situations are momentarily so uncertain that buyers and sellers are loathe to take a definite market position on futures. In the face of an almost nominal market, prices remained fairly steady and no price revisions were announced. Foreign markets closed firm and up slightly.

Foreign Interest in Naval Stores

Prices in rosin were mixed during December, the poorer grades showing net losses in the period under review, while the higher grades moved into higher levels. Turpentine closed out the month at 26c at Savannah (the last trading day at both Savannah and Jacksonville was Dec. 28). This was a net loss of 1c from the closing figure in November. A very heavy foreign demand came into the market in December. This was caused by the approach of higher ocean freight rates effective Jan. 1. Rosin stocks increased about 10,000 barrels at the three primary ports, but turpentine stocks decreased approximately the same amount. A big hole was made in turpentine stocks at Jacksonville.

In some quarters it is estimated that about 95% of the season's crop has reached primary ports. If this is true there should be a sharp decline in the near future in stocks of both rosin and turpentine with a consequent stiffening of the price structure.

4th Quarter Earnings to Show Declines

Chemical Tonnages Down 15-20% Below Same Period of '36—Manufacturing and Labor Costs are Higher—Anglo-Chilean Nitrate and Lautaro Nitrate Report Profits—Several Extra Dividends Declared in December—

The 1937 earnings statements of the leading chemical companies will contain the answer as to how great profits have been adversely affected by the serious slump in the final quarter of the year and these reports will not be available in most cases for several weeks to come. Various estimates are heard in the trade as to the probable decline in chemical sales in the last three months of '37, but the general consensus of opinions range between 15% and 20% below the corresponding quarter of '36. Certain large chemical consuming fields have been hit worse than others. The textile, automotive, and rubber industries have shown the sharpest declines and quite naturally chemical companies depending upon these groups for a large part of their tonnages will reflect this situation in their earnings.

However, most of the chemical companies have been helped in the past by the wide diversification of industries they serve and this condition will again prove a boon. On the other hand, labor costs are definitely higher. Price advances have been placed in effect in certain items, but no broad price increase has taken place. True, chemical prices have not shown sharp declines, the drop in the chemical price index of *The N. Y. Journal of Commerce* from the peak (July 3) to Dec. 31 having been but 3.7%, while an 18.1% loss occurred in paint materials between the high point on June 19 and Dec 31, and losses of 33½% in textiles, 31.4% in non-ferrous metals, and 39½% in grains are reported, to pick just a few at random.

Coal costs will be higher, and a strong possibility exists that additional freight rate increases will be granted by the I.C.C. Ocean rates are up 10 to 20%, affecting a number of companies who are dependent upon foreign raw materials.

Earnings Statements

Distributable net profit of Anglo-Chilean Nitrate for year ended June 30, last, amounted to £426,814 as compared with £363,290 for the preceding fiscal year. Of this amount, £212,241 will be paid out in interest at the rate of 4½% on both the sterling first-mortgage income-debenture stock and the dollar issue of sinking-fund-income debentures.

Remainder of the distributable earnings, £214,573, has been applied to debt retirement by purchase for redemption of the company's two funded debt issues. In addition, company has added £88,685 to its working reserves and £15,000 to its railway renewal reserves from the year's earnings.

Earnings applicable to the amortization funds will result in the retirement of £238,283, face amount of sterling first-mortgage income-debenture stock, and $690,000, face amount of the dollar issue of sinking-fund-income debentures, thus accomplishing a total retirement of debt of £606,950 and $1,323,000 since reorganization.

The 4½% annual income interest applicable to the dollar-income debentures was paid on Jan. 1, to registered holders of record at the close of business Dec. 21.

Sterling bondholders received 2¼% on Jan. 1, an interim payment of 2¼% having been made as to this issue on July 1, 1937.

Lautaro Nets £450,490

Net profit of £450,490 is reported for the fiscal year 1937 by Lautaro Nitrate, compared with £362,165 for the preceding year.

Of the current amount £341,819 will be paid out in interest on the dollar issue of first mortgage income bonds; 3¾% interest on the two sterling issues of first mortgage income debenture stock and 2% to bank creditors.

Remainder of the distributable earnings of £108,671 has been applied to debt retirement by purchase for redemption of the company's three funded debt issues, Medley G. B. Whelpley, chairman, stated in making the report public in London.

Converted into dollars, earnings applicable to the amortization fund will result in the retirement of $1,347,000 face amount of first mortgage income bonds and of £51,862 face amount of the two sterling first mortgage income debenture stock issues.

On this retirement the company will have regained $2,262,000 of the dollar issue and £95,565 of the sterling issues for the two years ended June 30 and since its reorganization.

Harshaw $460,241 for 9 Mos.

The annual report of Harshaw Chemical shows a net profit of $460,241 for the 9 months ended Sept. 30, 1937, after all charges. For the 12 months fiscal year ended Dec. 31, 1936, net profits of the company had been $412,318. Net profit for the 9 months of this year amounts to $3.43 for each of the 118,915 shares of common stock now outstanding exclusive of 3,300 shares held in the treasury. Due to a change in fiscal year, annual report covers only 9 months operations.

Abbott Issue Taken Up

Offering of 20,000 shares of Abbott Laboratories 4½% $100 par cumulative convertible preferred stock was oversubscribed, according to the underwriters. Issue sold at 103 compared with an offering price of par.

The Abbott issue appears to have been taken up mainly by some discretionary trust funds and insurance company funds which absorbed the preferred promptly for the simple reason that they needed it and could afford the low rate that it was paying. The issue was decidedly attractive to this class of investor in view of the very substantial earning power of the company and the small assessment against total earnings that preferred requirements of $90,000 annually represent.

Dividend News*

An extra distribution of 25c and the regular quarterly dividend of 25c were voted on the stock of Air Reduction. Similar amounts were paid on Jan. 15, '37.

Allied Chemical declared a special dividend of $1.50, payable Dec. 22. In February, May, August and November regular quarterly of $1.50 was paid. Company states that regular dividend payment dates have been changed to the 20th day of March, June, September and December from the first day of February, May, August and November.

A dividend of $2 on the common stock of American Hard Rubber was declared. Last dividend was $1 and was paid on Dec. 24, '36.

A year-end dividend of 50c and a dividend of 30c for the final quarter were announced by Climax Molybdenum. A 30c dividend was paid on Sept. 30.

Board of Directors of Hercules Powder on Dec. 29 declared a regular quarterly dividend of 1½% on its preferred. Dividend is payable on Feb. 15 to stockholders of record Feb. 4.

Directors of Heyden Chemical announced an extra dividend of 50c a share on the common.

Merck Declares 75c Extra

Merck directors declared a dividend of 25c per share and an additional dividend of 75c per share (or a total of $1 per share) on the common stock, payable Dec. 23 to holders of record Dec. 18.

Regular quarterly dividends of 25c per share were paid on Oct. 1, July 1 and on April 1, last; an extra dividend of 20c in addition to a quarterly dividend of 20c was paid on Dec. 15, '36; a dividend of 20c was paid on Oct. 1, '36; and regular dividends of 10c per share were previously distributed each three months.

* The usual Dividends and Dates Table, The Trend of Representative Chemical Stocks Table, and the Summary of Earnings Statements Compilation will be found in the new Statistical Data Section.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1936 Average $1.18 - Jan. 1937 $1.11 - December 1937 $1.19

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs lb.	.32	.43	.32	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	...	.29	.24	.29	.24	.26
Acetic Anhydride, 100 lb cbys lb.	.20	.24	.20	.24	.21	.25
drs, f.o.b. wks, frt all'd lb.	.13	.15	.13	.15	...	.15
Acetin, tech, drs lb.	...	.33	.22	.33	.22	.24
Acetone, tks, f.o.b. wks, frt allowed lb.	...	.04¾	.04¾	.06½	.06	.11
drs, c-l, f.o.b. wks, frt all'd lb.	...	.05¾	.05¾	.07½	.07	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68

ACIDS

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Abietic, kgs, bbls lb.	.09¾	.10	.06¾	.10	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.23	2.23	2.53	...	2.45
glacial, bbls, c-l, wks 100 lbs.	...	7.62	7.62	8.70	...	8.43
glacial, USP, bbls, c-l, wks 100 lbs.	...	10.25	10.50	12.43	...	12.43
Acetylsalicylic, USP, 225 lb bbls lb.	...	.60	.50	.60	...	...
Adipic, kgs, bbls lb.	.	.72	.	.72	...	.72
Anthranilic, ref'd, bbls lb.	.95	1.00	.85	1.00	.85	.95
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, wks 100 lbs.	1.60	2.55	1.35	2.60	1.35	2.50
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.40	.45
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	95.00	...	95.00	...	95.00
Broenner's, bbls lb.	...	1.11	...	1.11	1.11	1.25
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	...	5.25
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¼%, drs, delv lb.	.15¼	.17¼	.15¼	.16¾	.14¾	.16¾
Citric, USP, crys, 230 lb bbls lb. *b*	.24	.25	.24	.26	.25	.29
anhyd, gran, bbls lb. *b*	...	.26½	.26½	.29	.29	.31
Cleve's, 250 lb bbls lb.	.50	.52	.50	.52	.50	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.89	.91	.72	.91	.51	.74
99%, straw, LB, drs, wks, frt equal gal.	.92	.94	.77	.94	.68	.79
resin grade, drs, wks, frt equal lb.	.10¾	.11¼	.09	.11¼	.52*y*	.65*y*
Crotonic, drs lb.	.75	1.00	.75	1.00	.90	1.00
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.13	.11	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.75	.79	.65	.75	.65	.68
USP, bbls lb.	.87	.91	.77	.91	.70	.80
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	.80	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 34% com 155 lb cbys, wks lb.	.42	.44	.40	.42	...	...
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.10½	.15	.10½	.15	.11	.12
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.05
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.07
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.12
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.10
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.14½
USP X, 85%, cbys lb.	.42	.45	.42	.50	.45	.50
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.47
Linoleic, bbls lb.	...	.20	.16	.20	.16	.16
Maleic, powd, kgs lb.	.30	.40	.29	.40	.29	.32
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	1.35	1.50	...	1.35
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00
Muriatic (continued): 20°, cbys, c-l, wks 100 lb.	...	1.75	1.45	1.75	...	1.45
tks, wks 100 lb.	...	1.10	..	1.10	1.10	1.20
22°, c-l, cbys, wks 100 lb.	...	2.25	1.95	2.25	...	1.95
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.14	.11	.14
Sludges, drs lb.	...	.05	.05	.10	.06	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. lb.	.10¾	.12	.10¾	.12	.10¾	.12½
Phosphoric, 50%, USP, cbys lb.	.12	.14	.12	.14	.14	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.35	.40	.35	.40	.30	.40
Propionic, 98% wks, drs lb.	...	.22	.20	.22	...	.35
80% lb.	.16	.17½	.16	.17½	.15	.17½
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.05	...	...	...	...
cryst, USP lb.	1.45	1.63	1.30	1.48	...	...
Ricinoleic, bbls lb.	...	.38	.35	.38	...	...
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.40
Sebacic, tech, drs, wks lb.	.37	.41	.37	.41	...	...
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.19
Sulfuric, 60°, tks, wks ton	...	13.00	12.00	13.00	11.00	12.00
c-l, cbys, wks 100 lb.	...	1.25	1.10	1.25	...	1.10
66°, tks, wks ton	...	16.50	15.50	16.50	...	15.50
c-l, cbys, wks 100 lb.	...	1.50	1.35	1.50	...	1.35
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	..	18.50
Tannic, tech, 300 lb bbls lb	.40	.47	.19	.47	.19	.40
Tartaric, USP, gran, powd, 300 lb bbls lb.	.24¼	.24¾	.21¾	.25¼	.22¾	.24
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.72½
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.45	2.75
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	no price		2.50	2.75	1.50	1.60
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls lb.	.52	.60	.47	.60	.50	.60
dark, bbls lb.	.11	.15	.11	.17	.12	.17
egg, edible lb.	...	1.05	.76	1.05	.77	1.05
vegetable, edible lb.	.74	.78	.76	.78	.65	.70

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

ALCOHOLS

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.123	...	.123	.123	.143
c-l, drs, delv lb.	...	.133	...	.133	.133	.150
lcl, drs, delv lb.	...	.143	...	.143	.143	.157
Amyl, secondary, tks, delv lb.	...	.08½	..	.08½	.08½	.108
Benzyl, cans lb.	.68	1.00	.65	1.10	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt allowed lb. *d*	...	.09	.08½	.09	.08½	.11
c-l, drs, f.o.b. wks, frt allowed lb. *d*	...	.10	.09½	.10	.09½	.12
Butyl, secondary, tks, delv lb. *d*	...	.06	.06	.07	.07	.096
c-l, drs, delv lb. *d*	...	.07	.07	.08	.08	.106
Capryl, drs, tech, wks lb.	...	.85		.85		.85
Cinnamic, bottles lb.	2.00	2.50	2.00	3.65	2.50	3.65
Denatured, CD, No. 1, 12, 13, c-l, drs, wks gal. *e*	...	.35	.33	.35	.30	.44*
Western schedule, c-l, wks gal. *e*	...	.28	.37	.39	.39	.52*
Denatured, SD, No. 1, tks	...	.27	.26	.27	.23	.28
c-l, drs, wks gal. *e*	...	.33	.32	.33	.29	.34
Diacetone, tech, tks, delv lb. *f*	...	.11½	...	.11½	...	.16
c-l, drs, delv lb. *f*	...	.12½	...	.12½	...	.17
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.06	4.05	4.07	4.07	4.10
c-l, drs gal. *g*	...	4.12	4.11	4.12	4.11	4.27
c-l, bbls gal. *g*	...	4.13	4.12	4.13	4.12	4.28
absolute, drs gal. *g*	4.54	6.08½	4.54	6.08½	4.54	6.11½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices—Current

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Alcohols (continued)						
Furfuryl, tech, 500 lb drs lb.	.30	.35	.30	.35	...	.35
Hexyl, secondary tks, delv lb.	...	.12	.11½	.12	...	.11½
c-l, drs, delv ... lb.	...	.13	.12½	.13	...	.12½
Normal, drs, wks ... lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delvd ... lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs .. lb.	...	.10	...	.10	.10	.12
c-l, drs ... lb.	...	.09½	...	.09½	.09½	.11½
tks ... lb.	...	.08½	...	.08½	.08½	.10½
Isopropyl, refd, c-l, drs, f.o.b. wks, frt allowed .. lb.	...	.39½	.39½	.45	.45	.55
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	...	.28	.27	.28	.24	.32
Aldehyde ammonia, 100 gal drs ... lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls ... lb.	...	.52	...	.52	.52	.65
Alphanaphthylamine, 350 lb bbls ... lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ... 100 lb.	...	3.25	3.00	3.25	...	3.00
delv NY., Phila .. 100 lb.	...	3.40	3.15	3.40	...	3.15
Granular, c-l, bbls. wks ... 100 lb.	...	3.00	2.75	3.00	...	2.75
Powd, c-l, bbls, wks 100 lb.	...	3.40	3.15	3.40	...	3.15
Chrome, bbls ... 100 lb.	6.50	6.75	6.50	7.25	7.00	7.25
Potash, lump, c-l, bbls, wks ... 100 lb.	...	3.50	3.25	3.50	...	3.25
Granular, c-l, bbls, wks ... 100 lb.	...	3.25	3.00	3.25	...	3.40
Powd, c-l, bbls, wks 100 lb.	...	3.65	3.40	3.65	...	3.40
Soda, bbls, wks ... 100 lb.	...	3.25	...	3.25	...	...
Aluminum metal, c-l, NY 100 lb.	...	20.00	19.00	20.00	19.00	20.00
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks ... lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.07
Solution, drs, wks ... lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03½
Hydrate, 96%, light, 90 lb bbls, delv ... lb.	.13	.15	.13	.15	.13	.15
heavy, bbls, wks ... lb.	.029	.03½	.029	.03½	.029	.04½
Oleate, drs ... lb.	.16¾	.18½	.16¾	.18½	.15¾	.18½
Palmitate, bbls ... lb.	.22	.23	.22	.23	.21	.22
Resinate, pp., bbls ... lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ... lb.	.19	.21	.19	.21	.18	.21
Sulfate, com, c-l, bgs, wks ... 100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks ... 100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks ... 100 lb.	...	1.90	...	1.90	...	1.90
c-l, bbls, wks ... 100 lb.	...	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs ... lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks .. lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.16	.22	.16	.22	.15¼	.22
26°, 800 lb drs, delv ... lb.	.02¼	.02½	.02¼	.02½	.02¼	.03
Aqua 26°, tks, NH .. cont.	...	.05	.04½	.05	.04½	.05
tk wagon ... lb.	...	.02	...	.02	.02	.024

AMMONIUM

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Ammonium Acetate, kgs .. lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks ... 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls .. lb.	.16	.17	.16	.17	.15	.17
carbonate, tech, 500 lb bbls ... lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks ... 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks ... 100 lb.	5.50	6.25	5.00	6.25	5.00	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls ... lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ... lb.	...	.23	...	...	...	...
Linoleate ... lb.	...	.15	.11	.15	.11	.12
Naphthenate, bbls ... lb.	...	.17	...	...	...	...
Nitrate, tech, cks ... lb.	.03¾	.04	.03¾	.04	.04	.05
Oleate, drs ... lb.	...	.15	.15	.10	...	.10
Oxalate, neut, cryst, powd, bbls ... lb.	...	.22½	.22½	.23	.26	.27
pure, cryst, bbls, kgs .. lb.	.27	.28	.27	.28	.27	.28
Perchlorate, kgs ... lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs .. lb.	.21	.24	.21	.24	.21	.25
Phosphate, dibasic tech, powd, 325 lb bbls ... lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls ... lb.	...	.15	...	...	...	...
Stearate, anhyd, bbls ... lb.	...	.24	...	...	...	...
Paste, bbls ... lb.	...	.07½	...	...	...	...
Sulfate, dom, f.o.b., bulk ton	...	28.00	26.00	28.00	22.00	26.00
200 lb bgs ... ton	...	29.30	...	29.30	...	...
100 lb bgs ... lb.	...	30.00	...	30.00	...	...
Sulfocyanide, kgs ... lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane) tks, delv ... lb.	...	.11½	...	.11½	.11½	.13½
tech, drs, delv ... lb.	.11½	.12	.11½	.13½	.12½	.149
Secondary, tks, delv .. lb.	...	.08½	...	.08½	...	.108
c-l, drs, delv ... lb.	...	.09½	...	.09½	.118	.123
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks ... lb.	.07	.077	.07	.077	.07	.077
tks, wks ... lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks ... lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs ... lb.	...	.25	...	.25	...	...
Stearate, lcl, wks, drs .. lb.	...	.26	...	.26	...	...

g Grain alcohol 20c a gal. higher in each case.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Amylene, drs, wks ... lb.	.102	.11	.102	.11	.102	.11
tks, wks ... lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks ... lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine ... lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% ... lb.	...	.75	...	.75	...	.75
40% ... lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls ... lb.	...	.65	.50	.65	.50	.52

ANTIMONY

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Antimony metal slabs, ton lots ... lb.	...	.14	.13⅝	.17¼	.11⅜	.14
Butter of, see Chloride.						
Chloride, soln cbys ... lb.	...	.17	...	.17	.13	.17
Needle, powd, bbls ... lb.	.14	.16	.14	.19½	.11	.12½
Oxide, 500 lb bbls ... lb.	.15½	.16½	.14¼	.16½	.12¾	.14
Salt, 63% to 65%, tins .. lb.	.23¾	.24	.22	.24	.22	.24
Sulfuret, golden, bbls ... lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls .. lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls ... lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks ... lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl ... lb.	.08½	.09	.08½	.09¾	.08¾	.09¾
Arsenic, Metal ... lb.	.42	.44	.42	.44	.40	.44
Red, 224 lb cs kgs ... lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs ... lb.	.03	.04	.03	.04	.03	.04½
Barium Carbonate precip, 200 lb bgs, wks ... ton	52.50	62.50	52.50	62.50	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs ... ton	...	44.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs, N Y ... lb.	.16½	.17½	.16½	.17½	.15½	.17½
Chloride, 600 lb bbls, dlvd, zone 1 ... ton	79.00	92.00	74.00	92.00	74.00	74.00
Dioxide, 88%, 690 lb drs ... lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls ... lb.	.04¾	.05½	.04¾	.05½	.05¼	.06
Nitrate, bbls ... lb.	.07	.08¼	.07	.08¼	.07	.08¾
Barytes, floated, 350 lb bbls wks ... ton	...	23.65	23.65	23.65	23.65	23.65
Bauxite, bulk, mines ... ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, No. 1, bgs, wks ... ton	...	16.00	...	16.00	...	16.50
No. 2 ... ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks ... lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed ... gal.	...	.16	...	.16	.16	.18
90% c-l, drs ... gal.	...	.21	...	.21	...	.23
Ind pure, tks, frt allowed ... gal.	...	.16	...	.16	.16	.18
Benzidine Base, dry, 250 lb bbls ... lb.	.70	.72	.70	.72	.70	.74
Benzoyl Chloride, 500 lb drs ... lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs .. lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl, wks ... lb.	.23	.24	.23	.24	.24	.27
Naphthylamine, sublimed, 200 lb bbls ... lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ... lb.	.51	.52	.51	.52	.51	.55
Bismuth metal ... lb.	1.00	1.10	1.00	1.10	1.00	1.10
Chloride, boxes ... lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ... lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes ... lb.	...	2.95	2.75	3.04	2.95	3.00
Subbenzoate, boxes ... lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs ... lb.	1.23	1.58	1.23	1.58	1.40	1.45
Trioxide, powd, boxes ... lb.	...	3.57	3.45	3.57	3.45	3.50
Subnitrate ... lb.	1.22	1.48	1.22	1.48	1.30	1.35
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ... ton *h*	40.00	75.00	40.00	75.00	42.50	70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract .. 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks ... lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY .. unit	...	3.10	3.10	4.30	2.50	4.25
Chicago, high grade ... unit	...	3.10	3.00	4.65	2.90	4.50
Imported shipt ... unit	...	3.35	3.25	4.10	2.60	3.75
Blues, Bronze Chinese Milori Prussian Soluble ... lb.	.36	.37	.36	.37	.37	.38½
Ultramarine,* dry, wks, bbls ... lb.	...	.11	.10	.11	...	.10
Regular grade, group 1 lb.	...	.16	.15	.16	...	.15
Special, group 1 ... lb.	...	.19	.18	.19	...	.18
Pulp, No. 1 ... lb.	...	.27	.26	.27	...	.26
Bone, 4½ + 50% raw, Chicago ... ton	26.00	30.00	26.00	30.00	20.00	25.00
Bone Ash, 100 lb kgs ... lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ... lb.	.06½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp .. ton	...	23.75	23.75	27.50	23.00	26.00
Domestic, bgs, Chicago ton	20.00	22.00	19.00	27.00	16.00	20.00

BORAX

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Borax, tech, gran, 80 ton lots, sacks, delv ... ton *i*	...	42.00	40.00	42.00	...	40.00
bbls, delv ... ton *i*	...	52.00	50.00	52.00	...	50.00
Tech, powd, 80 ton lots, sacks ... ton *i*	...	47.00	45.00	47.00	...	45.00
bbls, delv ... ton *i*	...	57.00	56.00	57.00	...	56.00
Bordeaux Mixture, drs ... lb.	.11	.11½	.10½	.11	.08	.16

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Bromine, cases	lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs	lb.	.90½	.92½	.80	1.50	.80	1.50
Gold, blk	lb.	.45	.65	.40	.65	.40	.55
Butanes, com 16-32° group 3 tks	lb.	.02¼	.03¾	.02¼	.03¾	...	.04
Butyl, Acetate, norm drs, frt allowed	lb.	.10	.10½	.10	.10½	.09½	.12½
tks, frt allowed	lb.	...	.09	...	.09	.08½	.11
Secondary, tks, frt allowed	lb.	...	.07	.07	.07½	.07½	.096
drs, frt, allowed	lb.	.08	.08½	.08	.09	.106	.111
Aldehyde, 50 gal drs, wks	lb.	...	.17½	.16½	.17½	.19	.21
Carbinol, norm drs, wks	lb.	.60	.75	.60	.75	.60	.75
Lactate	lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed	lb.	...	.25	...	.25	...	...
Propionate, drs	lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv	lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs	lb.	...	.26	.25	.26	...	.26
Tartrate, drs	lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks	lb.	...	.35½	...	.35½	...	...
Cadmium Metal	lb.	1.60	nom.	1.05	1.60	.75	1.05
Sulfide, orange, boxes	lb.	1.50	1.60	.90	1.60	.90	1.10
CALCIUM							
Calcium, Acetate, 150 lb bgs c-l, delv	100 lb.	...	1.65	1.65	2.25	...	2.10
Arsenate, North and West, dealers, drs	lb.	.06¾	.07¼	.06¼	.07¾	.06¼	.07¾
South, dealers, drs	lb.	.06½	.07	.06½	.07	.06½	.06¾
Carbide, drs	lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l	lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, delv	ton	...	23.50	22.00	23.50	...	22.00
Solid, 650 lb drs, c-l, delv	ton	...	21.50	20.00	21.50	...	20.00
Ferrocyanide, 350 lb bbls wks	lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls	lb.	.50	.57	.50	.57	.50	.57
Nitrate, 100 lb bgs	ton	...	28.00	26.10	28.00	...	26.50
Palmitate, bbls	lb.	.22	.23	.22	.23	.21	.22
Phosphate, tech, 450 lb bbls	lb.	.06½	.07½	.06½	.07½	.07½	.08
Resinate, precip, bbls	lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls	lb.	.19	.21	.19	.21	.18	.21
Camphor, slabs	lb.	.55	.56	.54	.56	.50	.56
Powder	lb.	.55	.56	.54	.56	.4940	.56
Camwood, Bk, ground bbls	lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs	lb.	.05	.05¾	.05	.05¾	.05¼	.08
Black, c-l, bgs, delv, price varying with zone†	lb.	.0320	.0410	.0320	.0535	.0445	.0535
lcl, bgs, f.o.b. whse	lb.	...	.06½	.06½	.07	...	.07
cartons, f.o.b. whse	lb.	...	.07	.07	.07¾	...	.07¾
cases, f.o.b. whse	lb.	...	.07¾	.07¾	.08¼	...	.08¼
Decolorizing, drs, c-l	lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl	lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv	lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd	lb.	.11	.13½	.11	.20¾	.14½	.20¾
80-100 mesh, c-l, bgs	lb.	.11½	.14	.11½	.21¼	.15	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks	ton	...	21.00	21.00	25.00	15.00	20.00
Imported, ship, bgs	ton	...	nom.	...	nom.	17.00	18.00
Celluloid, Scraps, ivory cs	lb.	.12	.15	.12	.15	.17	.18
Transparent, cs	lb.	.12	.13	.12	.13	...	.20
Cellulose, Acetate, 50 lb kgs	lb.	...	.40	.40	.55	.55	.60
Chalk, dropped, 175 lb bbls	lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks	lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks	lb.	.03¼	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks	bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv*	ton	23.00	34.00	23.00	34.40	23.00	34.00
Willow, powd, 100 lb bbl, wks	lb.	.06	.07	.06	.07	.06	.06¼
Chestnut, clarified, tks, wks	lb.	...	.02125	.01625	.02125	.01625	.01⅞
25%, bbls, wks	lb.	...	.0225	.02	.0225	.01½	.02
Pwd, 60%, 100 lb bgs, wks	lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines	ton	...	6.50	...	6.50	...	7.00
Imported, lump, blk	ton	22.00	25.00	22.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract	lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract	lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract	100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont	lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks	lb.	3.00	3.50	3.00	3.50	...	3.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks	lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs	lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins	lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls	lb.	...	.80	...	.80	.85	.90
Chrome, Green, CP	lb.	.22	.25	.20	.25	.21½	.23
Yellow	lb.	.14½	.15½	.13	.16½	.11	.14
Chromium, Acetate, 8% Chrome, bbls	lb.	.05	.08	.05	.08	.06	.08
20° soln, 400 lb bbls	lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl	lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

Current

Coal Tar
Dinitrotoluene

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Coal tar, bbls . . . . bbl.	7.50	8.00	6.75	9.00.	7.25	9.00
Cobalt Acetate, bbls . . . . . . lb.	.66	.68	.58	.68	.58	.60
Carbonate tech, bbls . . . . lb.	. . .	1.63	1.42¾	1.63	1.35	1.48
Hydrate, bbls . . . . lb.	. . .	1.78	1.60	1.78	1.66	1.76
Linoleate, solid, bbls . . . lb.	. . .	.31	.31	.33	.30	.31¼
Oxide, black, bgs . . . . . . lb.	. . .	1.67	1.41	1.67	1.29	1.49
Resinate, fused, bbls . . . lb.	. . .	.13½	.13	.13½	.12½	.13
Precipitated, bbls . . . . lb.	. . .	.34	.30½	.34	. . .	.32
Cochineal, gray or bk bgs . . lb.	.35	.38	.32	.38	.32	.36
Teneriffe silver, bgs . . . . lb.	.36	.39	.33	.39	.33	.37
Copper, metal, electrol 100 lb.	. . .	11.00	11.00	16.25	9.50	12.00
Carbonate, 400 lb bbls . . lb.	.10½	.12½	.10½	.12½	. . .	.08¼
52-54% bbls . . . . lb.	.15¾	.16¾	.15¾	.19	.14½	.16¼
Chloride, 250 lb bbls . . . lb.	.15	.17	.15	.18	.17	.18
Cyanide, 100 lb drs . . . . lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls . . . . . lb.	. . .	.20	. . .	.20	. . .	.20
Oxide, black, bbls, wks . . lb.	.17	.17½	.17	.18	.14½	.15¾
red 100 lb bbls . . . . lb.	. . .	.19775	.17	.19975	.14	.15
Resinate, precip, bbls . . . lb.	.15	.16	.15	.19	.18	.19
Stearate, precip, bbls . . . lb.	.23	.24	.23	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls . . . . lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	. . .	4.50	4.50	6.00	3.85	4.55
Copperas, crys and sugar bulk c-l, wks . . . . ton	12.00	13.00	12.00	13.00	13.00	16.00
Corn Sugar, tanners, bbls 100 lb.	3.15	3.25	3.15	4.34	3.08	4.03
Corn Syrup, 42°, bbls . . 100 lb.	. . .	3.11	3.11	4.36	3.05	3.95
43°, bbls . . . . 100 lb.	. . .	3.16	3.16	4.41	3.10	4.05
Cotton, Soluble, wet, 100 lb bbls . . . . lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls . . . . . lb.	.19¾	.20¼	.15	.20¼	.15	.16¾
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks . . . . . . gal.	.13½	.14	.13	.14	.12½	.13½
Grade 2 . . . . gal.	.122	.132	.113	.132	.109	.12
Cresol, USP, drs . . . . lb.	.12½	.13	.10	.13	.10	.10½
Crotonaldehyde, 98%, drs, wks . . . . lb.	.26	.30	.26	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.04	.04¾	.04	.04¾	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit	. . .	1.15	1.10	1.15	1.07½	1.10
Derris root 5% rotenone, bbls lb.	.39	.47	.39	.47	. . .	. . .
Dextrin, corn, 140 lb bgs f.o.b., Chicago . . . 100 lb.	3.50	3.70	3.50	5.00	3.45	5.00
British Gum, bgs . . . 100 lb.	3.75	3.95	3.75	5.25	3.70	5.40
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl . . . lb.	. . .	.08	. . .	.08	. . .	.08
White, 140 lb bgs . . 100 lb.	4.00	4.20	4.00	4.58	3.40	4.95
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.75	1.00
Diamylene, drs, wks . . . . . . lb.	.095	.102	.095	.102	.095	.102
tks, wks . . . . lb.	. . .	.08½	. . .	.08½	. . .	.08½
Diamylether, wks, drs . . . . lb.	.085	.092	.085	.092	.085	.092
tks, wks . . . . lb.	. . .	.075	. . .	.075	. . .	.075
Oxalate, lcl, drs, wks . . lb.	. . .	.30	. . .	.30	. . .	. . .
Diamylphthalate, drs, wks lb.	.20½	.21	.19	.21½	.18	.19½
Diamyl Sulfide, drs, wks . . lb.	. . .	1.10	. . .	1.10	. . .	1.10
Dianisidine, bbls . . . . lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutoxy Ethyl Phthalate, drs, wks . . . . lb.	. . .	.35	. . .	.35	. . .	. . .
Dibutylamine, lcl, drs, wks lb.	. . .	.55	. . .	. . .	. . .	. . .
Dibutyl Ether, drs, wks, lcl lb.	. . .	.30	. . .	.30	. . .	. . .
Dibutylphthalate, drs, wks, frt allowed . . . . lb.	. . .	.21	.19½	.21	.18	.21
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.50	.35	.40
Dichlorethylene, drs . . . . . . lb.	. . .	.25	.25	.29	.29	. . .
Dichloroethylether, 50 gal drs, wks . . . . lb.	.15	.16	.15	.16	.16	.17
tks, wks . . . . lb.	. . .	.14	. . .	.14	. . .	.15
Dichloromethane, drs, wks lb.	. . .	.23	. . .	.23	. . .	.23
Dichloropentanes, drs, wks lb.	no prices		no prices		.032	.040
tks, wks . . . . lb.	no prices		no prices		. . .	.02½
Diethanolamine, tks, wks . . lb.	. . .	.25	.25	.35	. . .	.30
Diethylamine, 400 lb drs . . lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs . . lb.	.50	.52	.50	.52	.50	.55
Diethyl Carbinol, drs . . . . . lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅛	.35	.31⅛	.35	.31⅛	.35
90% grade, drs . . . . lb.	. . .	.25	. . .	.25	. . .	.25
Diethylorthotoluidin, drs . . lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.18	.19½	.18	.19
Diethylsulfate, tech, drs, wks, lcl . . . . lb.	. . .	.20	. . .	.20	. . .	.20
Diethyleneglycol, drs . . . . . lb.	.22	.23	.16½	.23	.15½	.17½
Mono ethyl ethers, drs . . lb.	.16	.17	.16	.17	.15	.17
tks, wks . . . . lb.	. . .	.15	. . .	.15	. . .	.15
Mono butyl ether, drs . . lb.	. . .	.26	. . .	.26	. . .	.26
Diethylene oxide, 50 gal drs, wks . . . . lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls . . . . . lb.	. . .	.21	.21	.24	. . .	.24
Laurate, bbls . . . . lb.	. . .	.27½	. . .	. . .	. . .	. . .
Stearate, bbls . . . . lb.	. . .	.27½	. . .	. . .	. . .	. . .
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis . . . . lb.	. . .	1.00	. . .	.95	. . .	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.30
Dimethyl Ethyl Carbinol, drs lb	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed . . . . lb.	. . .	.21	.20½	.21	.19½	.21½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. *k*	.16	.19	.16	.19	.16	.19½
Dinitrochlorobenzene, 400 lb bbls . . . . lb.	.14	.16	.14	.17½	.14	.15½
Dinitronaphthalene, 350 lb bbls . . . . lb.	.35	.38	.35	.38	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.14½	.15½	.14¼	.15½	.14½	.16½

k Higher price is for purified material.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Diphenyl, bbls .... lb.	.15	.25	.15	.25	.15	.25
Diphenylamine .... lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs .... lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	34.00	nom.	34.00	nom.	32.00	45.00
Extract .... lb.	.05	.05½	.05	.05½	.05	.05½
EGG YOLK						
Egg Yolk, dom., 200 lb cases lb.	.68	nom.	.68	nom.	.63	.68
Imported .... lb.	.65	nom.	.53	.65	.48	.56
Epsom Salt, tech, 300 lb bbls c-l NY .... 100 lb.	1.90	2.10	1.80	2.10	1.80	2.00
USP, c-l, bbls ...... 100 lb.	...	2.10	2.00	2.10	...	2.00
Ether, USP anaesthesia 55 lb drs .... lb.	.22	.23	.22	.23	.22	.23
(Conc) .... lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs .... lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed ...... lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles ... lb.	...	.68	.68	.77	.75	.77
Synthetic, wks, drs ..... lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt alld .... lb.	...	.05½	.05½	.06½	.06½	.08
drs, frt alld .... lb.	...	.06½	.06½	.07½	.07½	.09
95%, tks, frt allowed .. lb.	...	.06¾	...	.06¾	.07	.08½
drs, frt alld .... lb.	...	.07¾	...	.07¾	.08	.10
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	.37	.68
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs ..... lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt allowed .... lb.	.70	1.00	...	...	...	...
Chloride, 200 lb drs .... lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys ... lb.	...	.30	...	.30	...	.30
Crotonate, drs .... lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt allowed lb.	.27	.28	.27	.31	...	...
Lactate, drs, wks ...... lb.	...	.33	. .	.33	.25	.29
Methyl Ketone, 50 gal drs, frt allowed .... lb.	.07	.07½	.07	.07½	.07	.09
tks, frt allowed ...... lb.	...	.06½	...	.06½	.06½	.07½
Oxalate, drs, wks ...... lb.	.30	.34	.30	.34	.37½	.55
Oxybutyrate, 50 gal drs, wks .... lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks ...... lb.	...	.77	...	.77	...	...
Ethylene Dibromide, 60 lb drs .... lb.	.65	.70	.65	.70	.65	.70
Chloryhdrin, 40%, 10 gal cbys chloro, cont ..... lb.	.75	.85	.75	.85	.75	.85
Anhydrous .... lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17	.21
tks, wks .... lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks .... lb.	.20	.21	.20	.21	.20	.21
tks, wks .... lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks .... lb.	.16	.17	.16	.17	.16	.17
tks, wks .... lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks ...... lb.	...	.14	...	.14	.14	.18½
tks, wks .... lb.	...	.13	...	.13	.13	.16½
Mono, Methyl Ether, drs wks .... lb.	.18	.22	.18	.22	.19	.23
tks, wks .... lb.	...	.17	...	.17	...	.18
Oxide, cyl .... lb.	.50	.55	.50	.55	.50	.60
Ethylidenaniline .... lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery .... ton	...	14.50	...	14.50	...	14.50
Powd, blk, wks .... ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls .... lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys .... lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks .... unit *l*	no prices		3.50	4.25	2.50	3.50
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .... unit *m*	...	2.75	2.75	3.15	...	2.25
Fluorspar, 98%, bgs ..... lb.	no prices		no prices		30.00	35.50
Formaldehyde, USP, 400 lb bbls, wks .... lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.07
Fossil Flour .... lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines .. ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs .... ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks .. lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs .... lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16	.18
Fustic, crystals, 100 lb boxes .... lb.	.22	.26	.20	.26	.20	.23
Liquid 50°, 600 lb bbls .. lb.	.09½	.13	.08½	.13	.08½	.12
Solid, 50 lb boxes ...... lb.	.17½	.19½	.16	.19½	.16	.18
G SALT PASTE						
G Salt paste, 360 lb bbls ... lb.	.45	.47	.45	.47	.45	.47
Gall Extract .... lb.	.19	.20	.19	.20	.18	.20
Gambier, com 200 lb bgs .. lb.	...	nom.	...	nom.	...	.06
Singapore cubes, 150 lb bgs .... 100 lb.	...	.10½	.09½	.10½	.08	.09
Gelatin, tech, 100 lb cs ... lb.	.45	.50	.45	.55	.50	.55
Glauber's Salt, tech, c-l, bgs, wks* .... 100 lb.	.95	1.15	.95	1.15	.95	1.30
Anhydrous, see Sodium Sulfate.						
Glue, bone, com grades, c-l bgs .... lb.	.13	.16½	.11	.17½	.10½	.17½
Better grades, c-l, bgs lb.	.14½	.16½	.12½	.17½	.12	.17½
Casein, kgs .... lb.	.18	.22	.18	22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Glycerin, CP, 550 lb drs	lb.	.15½	.16	.15½	.29	.16	.21½
Dynamite, 100 lb drs	lb.	.15½	.16	.15½	.29	.13¾	.21½
Saponification, drs	lb.	.11	.11¼	.11	.29	.10¼	.22
Soap Lye, drs	lb.	.10	.10¼	.10	.27	.09¼	.20
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	...	...	...
Monoricinoleate, bbls	lb.	...	.27	...	...	...	...
Monostearate, bbls	lb.	...	.30	...	...	...	...
Oleate, bbls	lb.	...	.22	...	...	...	...
Phthalate	lb.	...	.37	.29	.37	.28	.29
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.26	...	...	...	...
Phthalate, drs	lb.	...	.40	.29	.40	.29	.35
Stearate, drs	lb.	...	.27½	.23	.27½	...	.23
GUMS							
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.11¾	.12	.10½	.15½	.09	.10¾
White sorts, No. 1, bgs	lb.	.24	.25	.24	.30	.25	.28
No. 2, bgs	lb.	.22	.23	.22	.28	.24	.26
Powd, bbls	lb.	.15	.16	.14	.19	.13	.14
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY	lb.	.02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.15	.25	.15	.25	.15	.19
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.19¼	.18⅞	.19¼	.18½	.20
Dark amber	lb.	...	.08⅞	.06⅞	.09¼	.06⅞	.08
Light amber	lb.	...	.13¼	.10¼	.14⅜	.10¼	.14⅛
Copal, East India, 180 lb bgs Macassar pale bold	lb.	...	.13	...	.13	.12⅝	.14
Chips	lb.	...	.05⅜	.05⅜	.06½	.06⅛	.06½
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10⅜	.10⅜	.11¼	.10⅜	.11⅛
Singapore, Bold	lb.	...	.15¼	.15¼	.15⅝	.15⅛	.16⅞
Chips	lb.	...	.04¾	.04¼	.05	.04⅜	.05¼
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10	.10	.10¾	.10	.11¼
Copal Manilla, 180-190 lb baskets, Loba A	lb.	...	.12	.09¾	.12	.09¼	.13
Loba B	lb.	...	.11⅝	.09¼	.11⅝	.08⅞	.12
Loba C	lb.	...	.11¼	.08⅞	.11¼	.08⅜	.11⅛
DBB	lb.	...	.08¾	.08	.08¾	.07⅝	.08⅞
Dust	lb.	...	.06⅝	.05¾	.06⅝	.05	.06⅛
MA sorts	lb.	...	.07¼	.06¾	.07¼	.06¾	.07⅝
Copal Pontianak, 224 lb cases, bold genuine	lb.	...	.16½	.15½	.16½	.14¼	.16
Chips	lb.	...	.10¼	.09⅛	.11⅛	.07	.08½
Mixed	lb.	...	.14	.13½	.14	.13¼	.13¾
Nubs	lb.	...	.12⅞	.12¾	.13½	.10¼	.12
Split	lb.	...	.13⅞	.13½	.15¼	.12¾	.13
Dammar Batavia, 136 lb cases A	lb.	...	.25½	.23½	.25½	.21⅜	.22¼
B	lb.	...	.24	.22⅛	.24	.20⅜	.21½
C	lb.	...	.20⅜	.18½	.20⅜	.16½	.17⅝
D	lb.	...	.17½	.15¼	.17½	.13⅝	.14⅜
A/D	lb.	...	.20⅜	.17⅝	.20⅜	.15½	.17⅛
A/E	lb.	...	.17¼	.14⅞	.17¼	.12⅞	.14½
E	lb.	...	.08½	.07½	.08½	.06¾	.07⅛
F	lb.	...	.07¼	.06¼	.07¼	.05⅞	.06⅞
Singapore, No. 1	lb.	...	.21⅛	.17⅛	.21½	.16¼	.17½
No. 2	lb.	...	.15⅜	.14⅛	.16¼	.13	.14¼
No. 3	lb.	...	.05¾	...	.05¾	.05¼	.05¾
Chips	lb.	...	.13½	.10¼	.13½	.09¾	.09¾
Dust	lb.	...	.05¾	.05¾	.06	.04¼	.05⅝
Seeds	lb.	...	.09½	.07⅞	.09½	.06⅝	.07⅜
Elemi, cons	lb.	.09⅜	.09½	.09⅜	.10¼	.09¾	.10¼
Ester	lb.	.09	.09¼	.09	.12	.07⅝	.10
Gamboge, pipe, cases	lb.	.80	nom.	.58	.80	.58	.59
Powd, bbls	lb.	...	.85	.65	.85	.65	.66
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx	lb.	.27	.30	.24	.30	.24	.25
xx	lb.	.18	.19	.16	.19	.16	.17
No. 1	lb.	.12	.13	.09½	.13	.09½	.10
No. 2	lb.	.11	.12	.08½	.12	.08½	.09
Kauri, NY, San Francisco, Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	...	.38	.33	.38	.33	.33½
B1	lb.	...	.28	.21	.28	.19	.21
B2	lb.	...	.24	.15½	.26	.14½	.15½
B3	lb.	...	.18½	.12	.18½	.12	.12½
Pale XXX	lb.	...	.61	.61	.65½	.65	.65½
No. 1	lb.	...	.41	.40	.41	.40	.40½
No. 2	lb.	...	.24	.22	.24	.22	.22½
No. 3	lb.	...	.17¾	.15	.17¾	.15	.15½
Kino, tins	lb.	2.00	2.10	.70	2.10	.70	.80
Mastic	lb.	.55	.56	.55	.58	.56	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	.25	.26	.25	.35	.19½	.38
Senegal, picked bgs	lb.	.24	.25	.20	.29	.20	.21
Sorts	lb.	.11¾	.12	.09¾	.15	.09¾	.12½
Thus, bbls	280 lbs.	13.75	14.00	12.00	14.00	11.00	12.00
Strained	280 lbs.	...	14.00	12.00	14.00	11.00	12.00
Tragacanth, No. 1, cases	lb.	2.75	3.00	2.40	3.25	1.20	2.50
No. 2	lb.	2.40	2.75	2.00	2.75	1.10	2.10
No. 3	lb.	2.35	2.70	1.95	2.70	.95	2.05
No. 4	lb.	2.30	2.65	1.85	2.65	.85	1.95
No. 5	lb.	2.25	2.50	1.65	2.50	.75	1.75
Yacca, bgs	lb.	.03½	.04½	.03¼	.04½	.03¼	.03¾
Helium, cyl (200 cu. ft.)	cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls	lb.	.18	.34	.16	.34	.16	.34
Hemlock, 25%, 600 lb bbls, wks	lb.	.03	.03¼	.03	.03¼	...	.02⅞
tks	lb.	...	.02¾	...	.02¾	...	.02½

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks gal.	...	.10½	...	.10½	...	.12
Hexamethylenetetramine, powd, drs lb.	.35	.36	.35	.36	.35	.39
Hexyl Acetate, secondary, delv, drs lb.	.13	.13½	.13	.13½	.13	.13½
tks lb.	...	.12	...	.12	...	.11½
Hoof Meal, f.o.b. Chicago unit	...	3.20	3.20	3.75	2.35	3.00
Hydrogen Peroxide, 100 vol, 140 lb cbys lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.16	.21	.15	.21	.17	.20
INDIGO						
Indigo, Bengal, bbls lb.	...	2.40	...	2.40	...	...
Synthetic, liquid lb.	.16½	.19	.16½	.19	.13	.14
Iodine, Resublimed, kgs lb.	1.50	1.60	1.50	1.60	1.50	1.75
Irish Moss, ord, bales lb.	.11	.12	.11	.12	.09	.10
Bleached, prime, bales lb.	.19	.20	.19	.21	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls 100 lb.	2.32	3.11	2.32	3.25	2.75	3.25
Isobutyl Carbinol (128-132°C) drs, wks lb.	.33	.34	.33	.34	.33	.34
tks, wks lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt allowed lb.	...	.05½	.05½	.06½	.06	.07½
drs, frt allowed lb.	.06½	.07	.06½	.08	.07	.09
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown ton	60.00	70.00	60.00	70.00	60.00	70.00
LEAD ACETATE						
Lead Acetate, f.o.b. NY, bbls, White, broken lb.	...	.11	.11	.13½	.11	.11½
cryst, bbls lb.	...	.11	.11	.13½	.10½	.11½
gran, bbls lb.	...	.11¾	.11¾	.14¼	.11	.12¼
powd, bbls lb.	...	.11¾	.11¾	.14¼	.11¼	.12¼
Arsenate, East, drs lb.	.13	.13½	.11	.13½	.09	.10
Linoleate, solid, bbls lb.	...	.19	.18	.19	.18	.26½
Metal, c-l, NY 100 lb.	...	4.75	4.75	7.05	4.50	6.00
Nitrate, 500 lb bbls, wks lb.	.11	.11½	.09	.11½	.09	.09½
Oleate, bbls lb.	.18½	.20	.15	.20	.15	.16
Red, dry, 95% Pb_3O_4, delv lb.	...	.07¼	.07¼	.0945	.07	.085
97% Pb_3O_4, delv lb.	...	.07½	.07½	.09¾	.07¼	.08¾
98% Pb_3O_4, delv lb.	...	.07¾	.07¾	.10	.07½	.09
Resinate, precip, bbls lb.	...	.16½	.14	.16½	...	.14
Stearate, bbls lb.	.22	.23	.22	.23	.22	23
Titanate, bbls, c-l, f.o.b. wks, frt allowed lb.	...	.12	.10	.12	...	...
White, 500 lb bbls, wks lb.	...	.06¾	.06¾	.09	.06½	.07¼
Basic sulfate, 500 lb bbls, wks lb.	...	.06¼	.06¼	.08¾	.06	.06½
Lime, chemical quicklime, f.o.b., wks, bulk ton	7.00	8.00	6.00	8.00	7.00	7.25
Hydrated, f.o.b., wks ton	8.50	12.00	8.00	12.00	8.50	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks gal.	...	.11	...	.11	...	.11
drs gal.	.13	.16	.13	.16	.13	.16
Linseed Meal, bgs ton	...	41.50	35.00	42.50	29.00	40.50
Litharge, coml, delv, bbls lb.	...	.06¼	.06¼	.08½	.06	.075
Lithopone, dom, ordinary, delv, bgs lb.	.04⅜	.04⅝	.04¼	.04⅝	.04¼	.04¾
bbls lb.	.04⅝	.04⅞	.04½	.04⅞	.04½	.05
High strength, bgs lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06¼
bbls lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Titanated, bgs lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06½
bbls lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Logwood, 51°, 600 lb bbls lb.	.09½	.11½	.08½	.11½	.06½	.10½
Solid, 50 lb boxes lb.	.15	.19	.15	.17½	.13½	.17½
Sticks ton	24.00	25.00	24.00	25.00	24.00	26.00
MADDER						
Madder, Dutch lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks lb.	.06¼	.07	.06	.07	.06	.06½
Chloride flake, 375 lb drs, c-l, wks ton	39.00	42.00	39.00	42.00	36.00	42.00
Fluosilicate, crys, 400 lb bbls, wks lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls lb.	.36	.40	.36	.40	...	.42
Heavy, 250 lb bbls lb.	...	.50	...	.50	...	.50
Palmitate, bbls lb.	.33	nom.	.33	nom.	.23	.24
Silicofluoride, bbls lb.	.09½	.10½	.09½	.10½	...	...
Stearate, bbls lb.	.21	.24	.21	.24	.20	.24
Manganese acetate, drs lb.	...	.26½	.25½	.26½	...	...
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l ton	...	62.50	47.50	62.50	...	47.50
Hydrate, bbls lb.	...	.32	...	.32	...	...
Linoleate, liq, drs lb.	.18	.19¼	.18	.19¼	...	...
solid, precip, bbls lb.	...	.19	.17½	.19	...	...
Resinate, fused, bbls lb.	.08¼	.08½	.08¼	.08½	...	...
precip, drs lb.	...	.12	...	.12	...	...
Sulfate, tech, anhyd, 90-95%, 550 lb drs lb.	.07	.07½	.07	.07½	...	...
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ton	25.00	25.50	25.00	27.00	25.50	27.00

Current

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Mannitol, pure cryst, cs, wks lb.	...	1.45	1.45	1.48	1.48	1.60
Marble Flour, blk .... ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercury chloride (Calomel) lb.	1.50	1.59	1.05	1.60	.81	1.20
Mercury metal ... 76 lb. flasks	81.00	82.00	81.00	99.00	73.50	95.00
Meta-nitro-aniline .... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls .... lb.	1.45	1.55	1.45	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls .... lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls .... lb.	.65	.67	.65	.67	.65	.69
Methanol, denat, grd, drs, c-l, frt all'd .... gal.	...	.36	.36	.53	...	...
tanks, frt all'd ...... gal.	...	.30	.30	.48	...	...
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	...	...
tanks .... gal.	...	.33	...	.33	...	...
95%, tks .... gal.	...	.31	...	.31	...	...
97%, tks .... gal.	...	.32	...	.32	...	...
Methyl Acetate, tech, tks, delv .... lb.	...	.06½	...	...	...	...
55 gal drs, delv ...... lb.	.07½	.08	...	...	...	...
C.P. 97-99%, tks, delv lb.	...	.07	...	...	...	...
55 gal drs, delv ...... lb.	.08	.08½	...	...	...	...
Acetone, frt all'd, drs gal. *p*	.34½	.40½	.34½	.58½	.45½	.68½
tks, frt allowed, drs gal. *p*	.28½	.32½	.28½	.44½	.41	.48
Synthetic, frt all'd, east of Rock M., drs .... gal. *p*	.42	.51	.42	.59½	.52½	.60
tks, frt all'd .... gal.	.36	.39½	.36	.49½	.48	.53
West of Rocky M., frt all'd, drs .. gal. *p*	...	.46	.46	.58	.55½	.69
tks, frt all'd .. gal. *p*	...	.39½	.39½	.51	.51	.63½
Anthraquinone .... lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks ...... lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl ..... lb.	.32	.40	.32	.43	...	.45
Ethyl Ketone, tks ...... lb.	...	.07½	...	.07½	...	.07½
Formate, drs, frt allowed lb.	.35	.36	.35	.39	...	...
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt allowed lb.	...	.30	...	.30	...	...
Propyl carbinol, drs .... lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks .. lb.	35.00	...	35.00	...	35.00	...
Michler's Ketone, kgs .... lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY .... gal.	...	.07	.07	.07¼	.07	.08¼
Monoamylamine, c-l, drs, wks lb.	.52	1.00	.52	1.00	...	1.00
Monobutylamine, lcl, drs, wks .... lb.	...	.65	...	...	...	...
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.25	.25	.30	...	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l .. lb.	...	.65	...	.65	...	...
Monomethylparaminosulfate, 100 lb drs .... lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls .. lb.	...	.04¼	...	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs .... ton	...	30.00	26.50	30.00	22.00	26.50
J2 bgs .... ton	...	22.50	19.00	22.50	14.25	16.75
R2 bgs .... ton	...	22.00	18.75	22.00	14.00	16.25
NAPHTHA						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks .... gal.	...	.31	...	.31	...	.31
drs, c-l .... gal.	...	.36	...	.36	...	.36
NAPHTHALENE						
Naphthalene, dom, crude, bgs, wks .... lb.	...	2.60	2.00	3.00	2.75	4.50
Imported, cif, bgs .... lb.	...	2.20	2.20	3.00	...	...
Balls, flakes, pks ...... lb.	...	.08	...	.08	.07¼	.08
Balls, ref'd, bbls, wks .. lb.	...	.07¼	...	.07¼	.06¾	.07¼
Flakes, ref'd, bbls, wks .. lb.	...	.07¼	...	.07¼	.06¾	.07¼
Nickel Carbonate, bbls .... lb.	.36	.37½	.36	.37½	...	.36
Chloride, bbls .... lb.	.18	.20	.18	.20	.18	.19
Metal ingot .... lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY .. lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ... lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs .... lb.	...	.76	...	.76	.75	1.17
Nitre Cake, blk .... ton	...	16.00	...	16.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks .... lb.	.08	.10	.08	.10	.08	.11
tks .... lb.	...	.07½	...	.07½	...	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.22	.29	.26	.29	.26	.34
Nitrogenous Mat'l, bgs, imp unit	...	2.55	2.55	3.55	2.00	3.10
dom, Eastern wks .... unit	2.70	2.50	2.50	4.25	1.90	3.00
dom, Western wks .... unit	...	2.25	2.25	3.75	1.85	2.75
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ..... lb.	no prices		.20	.22	.16	.18
Chinese, bgs .... lb.	no prices		.20	.22	.19	.20
OAK BARK						
Oak Bark Extract, 25%, bbls lb.	...	.03½	...	.03½	...	.03½
tks .... lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ... lb.	.16	.17	.16	.17	...	.15
Orange-Mineral, 1100 lb cks NY .... lb.	...	.10¼	.10¼	.12¾	.10	.11¼
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.82	.84
Orthochlorophenol, drs .... lb.	.35	.75	.35	.75	.50	.65

o Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Orthocresol, drs, wks ... lb.	.13½	.14½	.13½	.14½	.13	.15
Orthodichlorobenzene, 1000 lb drs ... lb.	.06	.07	.05	.07	.05	.11½
Orthonitrochlorobenzene, 1200 lb drs, wks ... lb.	.28	.29	.28	.29	.28	.29
Orthonitroparachlorphenol, tins ... lb.	.70	.75	.70	.75	.70	.75
Orthonitrophenol, 350 lb drs ... lb.	.85	.90	.85	.90	.52	.80
Orthonitrotoluene, 1000 lb drs, wks ... lb.	.07	.10	.07	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l ... lb.	.16	.17	.14	.17	.14	.15
Osage Orange, cryst, bbls ... lb.	.17	.25	.17	.25	.17	.25
51° liquid ... lb.	.07	.08	.07	.08	.07	.07¼
Paraffin, rfd, 200 lb cs slabs						
122-127° M P ... lb.	.0445	.04½	.0445	.04½	.0445	.04½
128-132° M P ... lb.	.04¾	.049	.04¾	.049	.04¾	.049
133-137° M P ... lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Para aldehyde, 110-55 gal drs ... lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ... lb.	.30	.45	.30	.45	.50	.65
Dichlorobenzene, 200 lb drs, wks ... lb.	.11	.12	.11	.20	.16	.20
Formaldehyde, drs, wks ... lb.	.34	.35	.34	.35	.34	.39
Nitroacetanilid, 300 lb bbls ... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ... lb.	.45	.47	.45	.47	.47	.51
Nitrochlorobenzene, 1200 lb drs, wks ... lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.45	.50
Nitrosodimethylaniline, 120 lb bbls ... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	.36	.37
Para Tertiary amyl phenol, wks, drs, c-l ... lb.	...	.26	...	.26	.26	.50
Phenylenedamine, 350 lb bbls ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ... lb.	.70	.75	.70	.75	.70	.75
tks, wks ... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ... lb.	.56	.58	.56	.58	.56	.60
Paris Green, dealers, drs ... lb.	.25½	.26½	.22	.26½	...	.24
Pentane, normal, 28-38° C, group 3, tks ... gal.	...	.08½	.08½	.09½	.09	.09½
drs, group 3 ... gal.	.14	.16	.12½	.16	.10	.16
Perchlorethylene, 100 lb drs, frt allowed ... lb.	...	.10½	...	.10½	.10½	.15
Petrolatum, dark amber, bbls ... lb.	.02⅞	.03	.02⅝	.03	.02⅝	.02⅞
Light, bbls ... lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls ... lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls ... lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls ... lb.	.02⅝	.03¾	.02⅛	.03¾	.02⅛	.02⅝
White, lily, bbls ... lb.	.06	.06¼	.06	.06¼	.06	.06¼
White, snow, bbls ... lb.	.07	.07¼	.07	.07¼	.07	.07¼
Petroleum Ether, 30-60°, group, 3 tks ... gal.	...	.13	...	.13	...	.13
drs, group 3 ... gal.	.14	.17	.15	.17	.15	.16

PETROLEUM SOLVENTS AND DILUENTS

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Cleaners naphthas, group 3, tks, wks ... gal.	...	.07⅜	.06⅞	.07⅞	.07⅜	.07½
Bayonne, tks, wks ... gal.	...	.10	.09½	.10	.09	.09½
Hydrogenated, naphthas, frt allowed East, tks ... gal.	...	.16	...	.16	.15	.16
No. 2, tks ... gal.	...	.18	...	.18	...	.18
No. 3, tks ... gal.	...	.16	...	.16	...	.15
No. 4, tks ... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks						
Bayonne ... gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ... gal.	...	.08⅜	.07⅞	.08⅞	.07⅞	.08½
Naphtha, V.M.P., East, tks, wks ... gal.	...	.11	.10	.11	.09	.10
Group 3, tks, wks ... gal.	...	.07⅜	.06⅞	.07⅞	.07⅜	.07½
Petroleum thinner, East, tks, wks ... gal.	...	.09½	.09	.10	.09	.09½
Group 3, tks, wks ... gal.	...	.06⅜	.05⅞	.06⅞	.06⅜	.06⅝
Rubber Solvents, stand grd, East, tks, wks ... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	...	.07⅜	.06⅞	.07⅞	.07⅜	.07½
Stoddard Solvent, East, tks, wks ... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	...	.06⅞	.06⅜	.07⅜	.06⅞	.07
Phenol, 250-100 lb drs ... lb.	.14½	.15½	.13¼	.15½	.13¼	.15
tks, wks ... lb.	...	.13½	.12¾	.13½	...	...
Phenyl-Alpha-Naphthylamine, 100 lb kgs ... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ... lb.	...	.17	.16	.17	...	.16
Phenylhydrazine Hydrochloride, com ... lb.	2.30	6.50	2.30	6.50	2.90	3.00
Phloroglucinol, tech, tins ... lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ... lb	20.00	22.00	20.00	22.00	20.00	22.00

Current

Phosphate Rock
Rosin Oil

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ton	...	1.85	...	1.85	...	1.85
70% basis ....ton	...	2.35	...	2.35	...	2.35
72% basis ....ton	...	2.85	...	2.85	...	2.85
75-74% basis ....ton	...	3.85	...	3.85	...	3.85
75% basis ....ton	...	5.50	...	5.50	...	4.35
Tennessee, 72% basis..ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl ....lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases ......lb.	.40	.44	.40	.44	.40	.45
Sesquisulfide, 100 lb cs..lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl ....lb.	.15	.18	.15	.20	.16	.20
Yellow, 110 lb cs, wks..lb.	.24	.30	.24	.33	.28	.33
Phthalic Anhydride, 100 lb drs, wks ....lb.	...	.14½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	.52	.55	.49	.65	.44	.50
Steam dist wat wh bbls gal.	...	.59	.59	.79	.64	.65
tks ....gal.	...	.54	.54	.74	...	.59
Pitch Hardwood, wks ....ton	18.25	18.75	15.00	18.75	...	15.00
Coaltar, bbls, wks .....ton	...	19.00	...	19.00	...	19.00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.03½	.06½	...	.03½
Imported ....lb.	.15	.16	.11	.16	.11	.13
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	5.75	6.25	5.75	6.50	4.00	5.25
Stearin, drs ....lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd ....oz.	32.00	38.00	32.00	68.00	34.50	64.00

POTASH

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake ....lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported 30% basis, blk .....unit	...	.58½	.55	.58½	...	...
Potassium Abietate, bbls ..lb.	...	.13	...	...	...	...
Acetate ....lb.	.26	.28	.26	.28	.26	.28
Bicarbonate, USP, 320 lb bbls ....lb.	.09	.18	.09	.18	.09	.18
Bichromate Crystals, 725 lb cks* ....lb.	.08¾	.09¼	.08¾	.09	.08½	.09
Binoxalate, 300 lb bbls..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ....lb.	.06½	.07	.06½	.07	.06½	.07½
liquid, tks ....lb.	...	.02⅞	.02¾	.02⅞	.02¾	.02⅞
drs, wks ....lb.	.02⅞	.03½	.02⅞	.03½	.02⅞	.03¼
Chlorate crys, 112 lb kgs, wks ....lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs ....lb.	.12	.13	.12	.13	.12	.13
powd, kgs ....lb.	.08½	.08¾	.08½	.08¾	.08	.08¾
Chloride, crys, bbls ....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs ....lb.	.28	.29	.28	.29	.23	.28
Cyanide, 110 lb cases ..lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls ......lb.	.93	1.00	.93	1.15	1.10	1.25
Metabisulfite, 300 lb bbls lb.	.11	.12	.11	.15	.13¾	.15
Muriate, bgs, dom, blk unit	...	.53½	.50	.53½	.45	.50
Oxalate, bbls ....lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks ...lb.	.09½	.11½	.09½	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls .....lb.	.35	.37	.35	.37	.35	.38½
Yellow, bbls ....lb.	.15	.16	.15	.18	.16	.19
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	33.75	36.25
Titanium Oxalate, 200 lb bbls ....lb.	.35	.40	.33	.40	.32	.35
Pot & Mag Sulfate, 48% basis bgs ....ton	...	25.75	24.75	25.75	22.25	24.75
Propane, group 3, tks ....lb.	.03	.04⅜	.03	.04⅜	.03	.04⅜
Putty, coml, tubs .....100 lb.	...	2.90	2.90	3.00	2.75	3.00
Linseed Oil, kgs ...100 lb.	...	4.65	4.65	4.75	4.50	4.75
Pyrethrum, conc liq:						
2.4% pyretherins, drs, frt allowed ....gal.	5.00	5.25	4.15	5.25	...	...
3.6% pyretherins, drs, frt allowed ....gal.	7.75	7.85	6.10	7.85	...	...
Flowers, coarse, Japan, bgs ....lb.	...	.18	.12¾	.18	...	...
Fine powd, bbls ......lb.	...	.19	.14	.19	...	...
Pyridine, denat, 50 gal drs gal.	...	1.55	1.30	1.55	...	1.30
Pyrites, Spanish cif Atlantic ports, blk ....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks ...lb.	...	.03	.02⅞	.03	.02⅝	.02⅞
450 lb bbls, c-l ....lb.	...	.03½	.03½	.03⅞	.03⅝	.03⅞
Solid, 63%, 100 lb bales cif ....lb.	...	.04	.03⅞	.04	.03⅝	.03⅞
Clarified, 64%, bales..lb.	...	.04¼	.04¼	.04⅜	.03⅞	.04⅜
Quercitron, 51 deg liq, 450 lb bbls ....lb.	.06	.06½	.06	.06½	.06	.06½
Solid, drs ....lb.	.10	.12	.10	.12	.10	.12

R SALT

	Current Market		1937 Low	1937 High	1936 Low	1936 High
R Salt, 250 lb bbls, wks ..lb.	.52	.55	.52	.55	.52	.57
Resorcinol tech, cans .....lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst ......lb.	.15	.15½	.14½	.15½	.14	.15
Powd, bbls ....lb.	.16	.16½	.13½	.16½	.13	.14
Rosin Oil, bbls, first run gal.	.52	.54	.52	.73	.38	.71
Second run ....gal.	.54	.56	.54	.75	.43	.73
Third run, drs ....gal.	.58	.60	.58	.79	.49	.77

* Spot price is ½c higher.

	Current Market		1937		1936	
			Low	High	Low	High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:†						
B	...	5.50	5.50	10.00	4.45	10.95
D	...	5.50	5.50	10.35	4.95	10.95
E	...	5.75	5.75	10.25	5.15	10.95
F	...	6.87½	6.87½	10.80	5.40	10.95
G	...	6.87½	6.87½	10.85	5.50	10.95
H	...	7.07½	6.90	10.85	5.60	10.95
I	...	7.07½	6.95	10.90	5.70	10.95
K	...	7.25	6.95	10.90	5.55	10.95
M	...	7.40	7.05	11.00	5.60	10.95
N	...	7.50	7.10	11.05	5.70	11.00
WG	...	8.20	7.65	11.75	5.85	11.00
WW	...	8.65	8.00	13.75	5.90	12.05
Rosins, Gum, Savannah (280 lb unit):†						
B	...	4.25	4.25	8.75	3.15	9.70
D	...	4.25	4.25	9.00	3.75	9.70
E	...	4.25	4.25	9.10	3.90	9.70
F	...	5.50	5.50	9.55	4.10	9.70
G	...	5.60	5.60	9.60	4.20	9.70
H	...	5.75	5.70	9.60	4.30	9.70
I	...	5.85	5.70	9.65	4.35	9.70
K	...	6.00	5.70	9.65	4.30	9.70
M	...	6.15	5.80	9.75	4.35	9.70
N	...	6.20	5.85	9.75	4.45	9.75
WG	...	7.00	6.40	10.50	4.45	9.75
WW	...	7.40	6.75	12.50	4.55	10.80
X	...	7.40	6.75	12.50	4.55	10.80
Rosin, Wood, c-l, FF grade, NY	...	6.40	6.40	10.72	6.10	10.52
Rotten Stone, bgs mines..ton	...	**35.00**	...	**35.00**	...	**35.00**
Imported, lump, **bbls** ...**lb.**	...	**.12**	...	...	...	...
Powdered, **bbls** ....**lb.**	.08½	**.10**	...	...	...	...
SAGO FLOUR						
Sago Flour, 150 lb bgs ...lb.	.03¼	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.20	1.15	1.20	1.15	1.30
Salt Cake, 94-96%, c-l, wks ton	**19.00**	**23.00**	**19.00**	**23.00**	**19.00**	**23.00**
Chrome, c-l, wks ......ton	**11.00**	**12.00**	**11.00**	**12.00**	**11.00**	**13.00**
Saltpetre, gran, 450-500 lb bbls ....lb.	.06½	.069	.06	.069	.059	.06¼
Cryst, bbls ....lb.	.07½	.0865	.07	.0865	.069	.08
Powd, bbls ....lb.	.07½	.079	.07	.079	.069	.07⅞
Satin, White, pulp, 550 lb bbls ....**lb.**	**.01¼**	**.01½**	**.01¼**	.01½	.01¼	**.01½**
Schaeffer's Salt, kgs ......lb.	**.46**	**.48**	**.46**	**.48**	**.46**	**.50**
Shellac, Bone dry, bbls..lb. *r*	.17	.17½	.17	.22	.17½	.26½
Garnet, bgs ....lb.	.14	.15	.14	.17	.16	.20
Superfine, bgs ....lb. *s*	.13	.13½	.13	.18½	.14½	.18½
T. N., bgs ....lb. *s*	.12	.12½	.12	.14½	.13½	.16
Silver Nitrate, vials .....oz.	.32⅝	.34⅞	.32⅝	.35½	.32$\frac{5}{16}$	.34⅞
Slate Flour, bgs, wks ....ton	**9.00**	**10.00**	**9.00**	**10.00**	**9.00**	**10.00**
Soda Ash, 58% dense, bgs,						
c-l, wks ....100 lb.	...	1.10	...	1.10	...	1.25
58% light, bgs .....100 lb.	...	1.08	...	1.08	...	1.23
blk ....100 lb.	...	.90	...	.90	...	1.05
paper bgs ....100 lb.	...	1.05	...	1.05	...	1.20
bbls ....100 lb.	...	1.35	...	1.35	...	1.50
Caustic, 76% grnd & flake, drs ....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs .....100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks ..100 lb.	...	1.97½	...	1.97½	...	1.97½
Sodium Abietate, drs .....lb.	...	**.13**	**.08**	**.13**	...	**.08**
Acetate, tech, 450 lb bbls, wks ....lb.	**.04¼**	**.05**	**.04¼**	**.05**	**.04½**	**.05**
Alignate, drs ....lb.	...	**.69**	**.64**	**.69**	...	**.64**
Antimoniate, bbls ......lb.	**.14¾**	**.15¼**	**.13¾**	**.16¼**	**.12**	**.14**
Arsenate, drs ....lb.	**.08**	**.08½**	**.08**	**.11½**	...	**.10½**
Arsenite, liq, drs .....gal.	**.30**	**.33**	**.33**	**.40**	**.40**	**.75**
Dry, gray, drs, wks ..lb.	.07½	.09½	...	...	...	...
Benzoate, USP, kgs ....lb.	**.46**	**.48**	**.46**	**.48**	**.46**	**.48**
Bicarb, 400 lb bbl, wks 100 lb.	...	1.85	1.75	1.85	1.75	1.85
Bichromate, 500 lb cks, wks* ....lb.	.06¾	.07¼	.06½	.07¼	.06½	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	**1.40**	**1.80**	...	...	...	...
Chlorate, bgs, wks .....lb.	**.06¼**	**.07½**	**.06¼**	**.07½**	**.06¼**	**.07½**
Cyanide, 96-98%, 100 &						
White, drs ....lb.	.09	.13	...	...	...	...
250 lb drs, wks ......lb.	**.16½**	**.17½**	**.15½**	**.17½**	**.15½**	**.17½**
Fluoride, 90%, 300 lb bbls, wks ....lb.	**.07½**	**.08¼**	**.07½**	**.08¼**	**.07¼**	**.08¼**
Hydrosulfite, 200 lb bbls, f.o.b. wks ....lb.	**.16**	**.17**	**.16**	**.17**	**.17**	**.19**
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	**2.50**	**3.00**	**2.50**	**3.00**	**2.50**	**3.00**
Tech, reg cryst, 375 lb bbls, wks ......100 lb.	**2.40**	**2.75**	**2.40**	**2.75**	**2.40**	**2.75**
Iodide ....lb.	**1.90**	**1.95**	**1.90**	**1.95**	**1.90**	**2.05**
Metal, drs, 280 lbs .....lb.	...	**.19**	...	**.19**	...	...
Metanilate, 150 lb bbls..lb.	**.41**	**.42**	**.41**	**.42**	**.41**	**.42**
Metasilicate, gran, c-l, wks ....100 lb.	...	**2.15**	...	**2.15**	**2.15**	**3.00**
cryst, bbls, c-l, wks 100 lb.	...	**2.75**	...	**2.75**	**2.75**	**3.25**
Monohydrate, bbls .....lb.	...	**.023**	...	**.023**	...	**.023**
Naphthenate, drs ....lb.	**.12**	**.19**	**.09**	**.19**	...	**.09**
Naphthionate, 300 lb bbl lb.	**.52**	**.54**	**.52**	**.54**	**.52**	**.54**
Nitrate, 92%, crude, 200 lb						
bgs, c-l, NY ....ton	...	**28.30**	**26.80**	**28.30**	**24.80**	**26.80**
100 lb bgs ....ton	...	**29.00**	**27.50**	**29.00**	**25.50**	**27.50**
Bulk ....ton	...	**27.00**	**25.50**	**27.00**	**23.50**	**25.50**

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; **Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case;** *s* T. N. and Superfine prices quoted f.o.b. N. Y. **and** Boston; **Chicago prices 1c higher;** Pacific Coast 3c; **Philadelphia f.o.b. N. Y. * Spot** price is ⅛c higher; † Closing prices Nov. 26th.

Current

Sodium Nitrite
Terpineol

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Sodium (continued):						
Nitrite, 500 lb bbls ..... lb.	.07	.10	.07	.10	.07	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks .. lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs .. lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.18
Peroxide, bbls, 400 lb ... lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.05	1.90	2.05	1.95	2.30
bgs, wks .... 100 lb.	...	1.85	1.70	1.85	1.75	2.10
Tri-sodium, tech, 325 lb bbls, wks .... 100 lb.	...	2.20	2.05	2.20	1.95	2.30
bgs, wks .... 100 lb.	...	2.00	1.85	2.00	1.75	2.10
Picramate, 160 lb kgs ... lb.	.65	.67	.65	.67	.65	.69
Prussiate, Yellow, 350 lb bbl, wks .... lb.	.10	.11½	.10	.11½	.10	.12
Pyrophosphate, anhyd, 100 lb bbls .... lb.	...	.10	...	.10	.10	.132
Sesquisilicate, drs, c-l, wks .... 100 lbs.	...	3.00	...	...	...	...
Silicate, 60°, 55 gal drs, wks .... 100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks .... 100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .... lb.	.05¾	.06½	.05¾	.07	.05¼	.07¼
Stannate, 100 lb drs .... lb.	.28	.31	.28	.44	.28½	.37½
Stearate, bbls .... lb.	...	.24	.19	.24	.20	.26
Sulfanilate, 400 lb bbls .. lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks .... 100 lb. †	1.45	1.90	1.45	1.90	1.30	1.90
Sulfide, 80% cryst, 440 lb bbls, wks .... lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks .... lb.	...	.02	...	.02	...	.03
Sulfite, cryst, 400 lb bbls, wks .... lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs ...... lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ... lb.	...	.12	...	.12	...	...
Tungstate, tech, crys, kgs lb.	...	nom.	.85	.90	.85	.90
Sorbitol, com., drs, basis content, wks .... lb.	...	.25	...	.25	...	...
Spruce Extract, ord, tks ... lb.	...	.01⅛	.01	.01⅛	...	.01
Ordinary, bbls .... lb.	...	.01⅝	.01½	.01⅝	...	.01½
Super spruce ext, tks ... lb.	...	.01⅜	.01⅜	.01⅝	...	.01⅝
Super spruce ext, bbls .. lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs .... lb.	...	.04	.04	.04¼	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	2.93	3.13	2.93	4.53	2.99	4.30
Powd, 140 lb bgs ... 100 lb.	3.03	3.23	3.03	4.63	3.90	4.54
Potato, 200 lb bgs ..... lb.		.05½	.04½	.05½	.04½	.05½
Imp, bgs .... lb.	.05½	.06	.05	.06	.05	.06
Rice, 200 lb bbls ...... lb.	...	.07¼	...	.07¼	...	.07¼
Wheat, thick, bgs ...... lb.	.07	.08½	.07	.08½	.08¼	.08½
Strontium carbonate, 600 lb bbls, wks .... lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks .... lb.	.45	...	.45	...	.45	...
tech, bbls, wks .... lb.	.40	...	.40	...	.40	...
Sulfur, crude, f.o.b. mines. ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs .... 100 lb.	1.65	2.35	1.65	2.35	1.60	2.35
bbls .... 100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs .. 100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .... 100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs ..... 100 lb.	2.85	3.00	2.85	3.00	2.40	3.00
Superfine, bgs ...... 100 lb.	2.65	2.80	2.65	2.80	2.20	2.80
bbls .... 100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers. bgs .... 100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls .... 100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs .... 100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls .... 100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks .... lb.	.03	.04	.02½	.04	...	...
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.06½	.08½
Multiple units, wks .... lb.	.04½	.07	.04½	.07	.05½	.06
tks, wks .... lb.	.04	.05	.04	.05	.04½	.04¾
Refrigeration, cyl, wks .. lb.	.16	.17	.15	.17	.10	.13
Multiple units, wks .... lb.	.07½	.10	.07½	.10	.07	.09¼
Sulfuryl Chloride .... lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ...... ton	...	62.00	58.50	65.00	52.00	60.00
Extract, 42°, bbls ...... lb.	.05¼	.06¼	.05¼	.06¼	...	...
Superphosphate, 16% bulk, wks .... ton	...	9.00	8.25	9.00	...	...
Run of pile .... ton	...	8.50	8.00	8.50	...	...
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ...... ton	...	.85	.70	.85	...	...
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	18.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	22.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	75.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	80.00
Tankage Grd, NY ..... unit ‡	...	3.00	3.00	4.40	2.65	4.25
Ungrd .... unit ‡	...	2.80	2.80	4.35	2.40	4.25
Fert grade, f.o.b. Chgo unit ‡	...	2.75	2.75	4.00	2.40	4.00
South American cif .. unit ‡	...	3.25	3.15	4.25	2.70	3.90
Tapioca Flour, high grade, bgs .... lb.	.03¼	.05½	.03¼	.05½	.03½	.05½
Tar Acid Oil, 15%, drs .. gal.	.22½	.25½	.21	.25½	.21	.24
25%, drs .... gal.	.26½	.29½	.24½	.29½	.24	.27½
Tar, pine, delv, drs ..... gal.	...	.26	...	.26	.25	.26
tks, delv, E. cities .... gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls .. lb.	.26¾	.27	.24¾	.27	.24¾	.25
USP, bbls .... lb.	.32	.32½	.30	.32½	.28	.30½
Terpineol, den grd, drs ... lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks .... lb.	.13	.14	.13	.14	.13	.14

† Bags 15c lower; ‡ + 10; * Bbls. are 20c higher.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech lb.	...	.10½	...	.10½	...	...
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.33	.33½	.33	.46	.35	.39½
Metal, NY lb.	...	.41	.41	.66	.40½	.52½
Oxide, 300 lb bbls, wks lb.	.48	.50	.48	.62	.47	.57
Tetrachloride, 100 lb drs, wks lb.	...	.21	.21	.32	.21¼	.26¾
Titanium Dioxide, 300 lb bbls lb.	.16¼	.17	.16¼	.17	.16¼	.19¼
Barium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Calcium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.27	.28
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls lb.	...	.75	...	.75	...	.75
Toluidine, bgs lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	.32	.36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	...
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	...	1.25
Tributylamine, lcl, drs, wks lb.	...	.70	...	...	...	...
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	...	..
Tributyl Phosphate, frt all'd lb.	...	.50	...	.50	...	..
Trichlorethylene, 600 lb drs, frt allowed E. Rocky Mts lb.	.089	.094	.089	.094	.089	.094
Tricresyl phosphate, tech, drs lb.	...	.26½	.22½	.26½	.19	.26
Triethanolamine, 50 gal drs wks lb.	.21	.22	.21	.30	.26	.30
tks, wks lb.	...	.20	.20	.25	...	.25
Triethylene glycol, drs, wks lb.	...	.26	...	...	...	...
Trihydroxyethylamine Oleate, bbls lb.	...	.30	...	...	...	...
Stearate, bbls lb.	...	.30	...	...	...	...
Trimethylamine, c-l, drs, frt allowed E. Mississippi lb.	...	1.00	...	1.00	...	...
Triphenylguanidine lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	.34	.36	...	...	...	...
Tripoli, airfloated, bgs, wks ton	26.00	30.00	25.00	30.00	27.50	30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	...	.31	.31	.47	.40½	.50
Savannah, bbls gal.	...	.26	.25	.42	.35½	.45
Jacksonville, bbls gal.	...	.26¼	.25	.41	.35¼	.44½
Wood Steam dist, bbls, c-l, NY gal.	...	.30	.30	.44	.38	.47
Wood, dest dist, c-l, drs gal.	...	.33	...	...	...	...
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½	.17
Fert grade, bgs, c.i.f. ton						
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00	110.00
Urea Ammonia liq 55% NH_3, tks unit	...	1.04	1.00	1.04	...	.96
Valonia beard, 42%, tannin bgs ton	...	52.00	35.00	52.00	46.00	64.50
Cups, 32% tannin, bgs ton	...	35.00	31.50	36.00	34.00	42.00
Vanilin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	3.10	3.10	3.65	3.65	3.75
Ex-guaiacol lb.	...	3.00	3.00	3.55	3.55	3.65
Vermilion, English, kgs lb.	1.60	1.69	1.60	1.90	1.52	1.85
Wattle Bark, bgs ton	39.75	41.75	31.00	43.75	26.50	32.00
Extract, 60°, tks, bbls lb.	...	.04⅝	.03⅝	.04⅝	...	.03⅝
WAXES						
Wax, Bayberry, bgs lb.	.16⅞	.17	.16½	.17½	.16½	.20
Bees, bleached, white 500 lb slabs, cases lb.	.39	.45	.38	.45	.34	.40
Yellow, African, bgs lb.	.25	.26	.25	.30	.24	.27
Brazilian, bgs lb.	.27	.29	.27	.34	.25	.29½
Chilean, bgs lb.	.27	.29	.27	.34	.25	.29½
Refined, 500 lb slabs, cases lb.	.35	.39	.29½	.39	.28	.32
Candelilla, bgs lb.	.13½	.14	.13	.16½	.14	.17½
Carnauba, No. 1, yellow, bgs lb.	.42	.43½	.42	.49	.43½	.48
No. 2, yellow, bgs lb.	.41	.42	.41	.46½	.42	.46
No. 2, N. C., bgs lb.	.39	.40	.38	.43	.38	.40
No. 3, Chalky, bgs lb.	.33	.34½	.33	.40	.33½	.38
No. 3, N. C., bgs lb.	.34	.35½	.34	.43	.34	.41
Ceresin, dom, bgs lb.	.08½	.12	.08	.12	.08	.11
Japan, 224 lb cases lb.	.10¼	.10½	.09½	.11¼	.08	.10½
Montan, crude, bgs lb.	.11	.12	.11	.12	.10¾	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.22	.24
Cakes, cases lb.	.24	.25	.24	.25	.23	.25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	...	15.00
Gilders, bgs, c-l, wks ton	...	15.00	...	15.00	11.50	15.00
Wood Flour, c-l, bgs ton	20.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.33	...	.33	...	.33
Coml, tks, wks, frt all'd gal.	...	.30	...	.30	...	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.36	.37
Zinc, Carbonate tech, bbls, NY lb.	.14	.15	.12	.15	.09	.11
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½	.05¾
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	2.00	2.25	...	2.00
Cyanide, 100 lb drs lb.	.36	.38	.36	.38	.36	.38
Zinc dust, 500 lb bbls, c-l, delv lb.	...	.0740	.0740	.094	.068	.0755
Metal, high grade slabs, c-l, NY 100 lb.	...	5.35	5.35	7.85	...	5.825
E. St. Louis 100 lb.	..	5.00	5.00	7.50	4.80	5.45
Oxide, Amer, bgs, wks lb.	.06	.07½	.05¼	.07¾	.05	.05½
French, 300 lb bbls, wks lb.	.06¼	.07¾	.05½	.07¾	.05½	.07
Palmitate, bbls lb.	.23	.25	.23	.25	.22	.23
Resinate, fused, pale, bbls lb.	...	.10	.09	.10	.05¾	.10
Stearate, 50 lb bbls lb.	.20	.23	.20	.23	.19	.23

Current

Zinc Sulfate
Oil, Whale

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Zinc Sulfate, crys, 400 lb bbl,						
wks ... lb.	...	.033	.028	.033	.028	.033
Flake, bbls ... lb.	...	.0375	.032	.0375	.032	.035
Sulfide, 500 lb bbls, delv lb.	.09¼	.09¾	.09¼	.09¾	.09¼	.11¾
bgs, delv ... lb.	.09	.09½	.09	.09½	.09	.11½
Sulfocarbolate, 100 lb kgs						
... lb.	.24	.26	.24	.26	.24	.25
Zirconium Oxide, crude, 73-75%						
grd, bbls, wks ... ton	75.00	100.00	...	...	...	...
kgs, wks ... lb.	.04¼	.04½	...	...	...	...

Oils and Fats

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Babassu, tks, futures ... lb.	.06¾	.06⅞	.06¾	.11¼	...	...
Castor, No. 3, 400 lb bbls .. lb.	.10¼	.10¾	.10¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls ... lb.	.12¼	.13	.12¼	.13	.12¼	.13
China Wood, drs, spot NY lb.	.15½	.16	.12½	.23	.13	.19¼
Tks, spot NY ... lb.	.15½	nom.	.118	.23	.125	.19
Coast, tks ... lb.	...	nom.	.133	.23	.127	.18
Coconut, edible, bbls NY .. lb.	...	.09½	.09½	.15	.09¼	.14¼
Manila, tks, NY ... lb.	...	.04⅛	.04	.09½	.04⅛	.07
Tks, Pacific Coast ... lb.	...	.03¾	.03¾	.08⅞	.03⅞	.08½
Cod, Newfoundland, 50 gal						
bbls ... gal.	.52	nom.	.51	.52	.40	.48½
Copra, bgs, NY ... lb.	...	.0235	.0235	.055	.0320	.0535
Corn, crude, tks, mills ... lb.	.06⅝	.06¾	.06½	.10¾	.08	.10½
Refd, 375 lb bbls, NY .. lb.	.09	.09½	.09	.13¼	.10¾	.13
Degras, American, 50 gal bbls.						
NY ... lb.	.07½	.08	.07½	.08¼	.05¼	.08
English, bbls, NY ... lb.	.07½	.08	.07½	.08¼	.04	.08
Greases, Yellow ... lb.	.04¼	.04½	.04¼	.09	.03⅜	.08¼
White, choice bbls, NY .. lb.	.06¾	.07½	.06¾	.10¼	.04⅛	.08¾
Lard Oil, edible, prime ... lb.	...	.12¾	.12¾	.16¾	.12¾	.16¼
Extra, bbls ... lb.	...	.10¾	.10¾	.13½	.09½	.13
Extra, No. 1, bbls ... lb.	...	.09¼	.09¼	.13½	.07¾	.12¼
Linseed, Raw less than 5 bbl						
lots ... lb.	...	.110	.107	.121	.104	.117
bbls, c-l, spot ... lb.	...	.102	.099	.113	.096	.103
Tks ... lb.	...	.096	.093	.107	.086	.097
Menhaden, tks, Baltimore gal.	.34½	nom.	.34	.45	.25	.36
Refined, alkali, drs ... lb.	.08	.082	.08	.10	.066	.084
Tks ... lb.	...	.074	.074	.09	.062	.078
Kettle bodied, drs ... lb.	.09	.092	.09	.11	.08	.096
Light pressed, drs ... lb.	.074	.076	.074	.094	.06	.078
Tks ... lb.	...	.067	.067	.084	.056	.072
Neatsfoot, CT, 20°, bbls, NY						
... lb.	...	.17¼	.16¾	.18¼	.16	.17
Extra, bbls, NY ... lb.	...	.09½	.09½	.13¾	.08	.12½
Pure, bbls, NY ... lb.	...	.11¾	.11¾	.14¼	.11½	.12¾
Oiticica, bbls ... lb.	.12¾	nom.	.10⅞	.17	.10	.15½
Oleo, No. 1, bbls, NY ... lb.	...	.10½	.10½	.14½	.09¼	.14
No. 2, bbls, NY ... lb.	...	.10	.10	.14	.08¾	.13½
Olive, denat, bbls, NY ... gal.	1.15	1.20	1.15	1.65	.73	1.60
Edible, bbls, NY ... gal.	2.35	nom.	2.20	2.50	1.60	2.25
Foots, bbls, NY ... lb.	.09⅝	.09⅞	.09⅝	.12½	.08	.10⅜
Palm, Kernel, bulk ... lb.	...	.04½	.04½	.08⅛	.04¾	.083
Niger, cks ... lb.	...	.04	.04	.07¼	.04	.06½
Sumatra, tks ... lb.	...	.0375	.0375	.06½	.03¾	.06½
Peanut, crude, bbls, NY .. lb.	.07	nom.	.06¼	.10⅝	.08	.10½
Tks, f.o.b. mill ... lb.	.06⅝	nom.	.06½	.10¼	.17¾	.10⅜
Refined, bbls, NY ... lb.	.10	nom.	.10	.13½	.12	.13¼
Perilla, drs, NY ... lb.	.11½	.11¾	.11	.13½	.07	.11¾
Tks, Coast ... lb.	...	.11	.105	.13	.066	.11¼
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.14½	.14¾	.13	.14¾	.086	.13½
Denatured, drs, NY ... gal.	.90	.91	.85	.97	.52	.85
Red, Distilled, bbls ... lb.	.09⅝	.10⅝	.09⅝	.12⅝	.08⅝	.11⅝
Tks ... lb.	.08¾	.09¾	.08¾	.10¾	.07¾	.09¾
Salmon, Coast, 8000 gal tks						
... gal.	...	nom.	...	nom.	.31	.32½
Sardine, Pac Coast, tks .. gal.	...	.37	.35	.55	.28	.47
Refined alkali, drs ... lb.	.08	.082	.08	.10	.066	.084
Tks ... lb.	...	.074	.074	.09	.062	.078
Light pressed, drs ... lb.	.074	.076	.074	.094	.06	.078
Tks ... lb.	...	.067	.067	.084	.056	.072
Sesame, yellow, dom ... lb.	.10¼	.10½	.10¼	.13¼	.12¾	.14½
White, dos ... lb.	.10¼	.10½	.10¼	.13¼	.12¾	.14½
Soy Bean, crude						
Dom, tks, f.o.b. mills ... lb.	...	.06	.06	.10½	.07	.10½
Crude, drs, NY ... lb.	.066	.072	.066	.11½	.076	.11½
Ref'd, drs, NY ... lb.	.078	.088	.078	.12½	.081	.12½
Tks ... lb.	...	.072	.072	.11½	.07½	.11½
Sperm, 38° CT, bleached, bbls						
NY ... lb.	.10	.102	.096	.102	.094	.102
45° CT, bleached, bbls,						
NY ... lb.	.093	.095	.089	.095	.087	.095
Stearic Acid, double pressed						
dist bgs ... lb.	.11	.12	.11	.13½	.08½	.12½
Double pressed saponified						
bgs ... lb.	.11¼	.12¼	.11¼	.13¾	.09	.12¾
Triple pressed dist bgs .. lb.	.14	.15	.14	.16½	.11¼	.15½
Stearine, Oleo, bbls ... lb.	.07	.07¼	.07	.11½	.07¼	.12¼
Tallow City, extra loose .. lb.	...	.05⅞	.05⅞	.09¼	.04⅛	.08⅜
Edible, tierces ... lb.	...	.06⅞	.06⅞	.10¼	.06¾	.09½
Acidless, tks, NY ... lb.	...	.09	.09	.13	.07	.11¾
Turkey Red, single, bbls .. lb.	.08	.08½	.08	.08½	.08	.08½
Double, bbls ... lb.	.12½	.13	.12½	.13	.12½	.13½
Whale:						
Winter bleach, bbls, NY lb.	.098	.10	.091	.111	.072	.087
Refined, net, bbls, NY .. lb.	.094	.096	.087	.107	.068	.083

Index to Advertisers

"We"—Editorially Speaking

A Postscript

Our leading editorial was written before the Jackson-Ickes blasts, so that its painstaking summary of the recovery program of the present administration stands forth in even more bold relief to these trust-busting tirades. The very core of the Roosevelt recovery plan has been interference with free competition, control of output and artificially raised prices and wages. The most dispassionate, professional economic criticism of the New Deal has centered upon this reactionary ideology, and we cannot credit a complete upset of the New Deal.

The Twentieth Century Fund has recently released a study of American corporations, revealing 594 companies, each having assets of over $50,000,000. All these together produced less than 20 per cent. of our national income. Although there are more than half a millon corporations in the country, yet 81 per cent. of our economic activity is carried on by individuals and personal partnerships.

Will the well advertised monopoly investigation include the C. I. O.?

No, "We" don't think so, either.

Credit Prof. Merriam of Chicago with another neat little chemical industry slogan: "Raw materials are important; but if the mind is as raw as the materials, nothing will happen."

Betting is five to one in our shop that one of our esteemed contemporaries (as the saying is) will adopt the idea of our new "Data Section" (see blue sheets) before the budget is balanced.

Blame the newspapers for creating the fear that caused the recession and Congress for the continued unbalanced budget—my goodness gracious, but it must be a grand and glorious feeling never to be wrong.

Add to your saga of chemical vice presidents the story of the one in "60 E. 42nd" who confesses he just can't help loving his secretary because she bosses him so it makes him feel right at home.

Quotes of the month:

"The economics of scarcity is a heritage of the cave-man."—Frank C. Whitmore, new A. C. S. president.

"It is a dangerous error to regard taxation as a political issue."—*The Houghton Line.*

At Niagara Falls, Hooker and Carbide & Carbon Chemicals are racing neck and neck for basketball championship.

Rival contenders for first wise-crack honors at the Chemical Exposition were the "Bastards of the Repression" and the ideal "Blue Knocks" salesman.

The famous dyestuff executive who escorted the chemurgic giants, Wheeler McMillen and W. J. Hale, up and down the aisles, explained his position in the triumvirate by describing himself as official representative of the Alcohol Consumers Council, which is almost funny enough to be true.

Yes, "We" know you've heard it before, but still "We" like the slogan "Beautiful but dumb," which was awarded to so many booths nobody need feel self conscious about it.

Award for beauty—not dumbness—our vote goes to Pfizer.

On advice of counsel "We" refuse to cast the first stone—we mean "vote"—for either the most dumb or the most intelligent exhibit.

The chap who thought up the idea of giving away those nice big strong paper bags ought to be reprimanded for taking advantage of the other fellow's troubles.

Here are some live research tips from the inquiries received at our booth:

Something to take the gritty feeling out of mechanic's hand soap.

A good aphrodisiac.

A gadget to make a centrifugal run backwards.

A cheap substitute for gin in cocktails.

Remover for toe-nail paint.

A process for extracting potash from common feldspar.

Obviously, two "controls" sadly lacking are the control of confidence and the control of expenditures.

Two little news items released from the office of the American Commercial Attache in Tokyo intrigue us strangely. 1—"In view of the increasing consumption of benzol in the chemical industry, the Japanese Department of Commerce in industry has been reported to be making present preparations to encourage production by the gas companies." 2—"It is understood that there is an acute shortage of benzol as a result of the Chinese incident, and consequently, the Japanese Finance Department has decided to issue permits for imports of substantial quantities of the chemical from the United States." This might be called putting two and two together to get three, or the height of diplomatic news.

Fifteen Years Ago

From our issues of January, 1923

New York chemists form American Institute of Chemistry.

Sterling Products concludes negotiations for purchase Chas. H. Phillips Chemical plant, at price close to $5,000,000.

Drysalters Club of New England holds thirty-eighth anniversary banquet.

Soda & Potash Corp. organized at Los Angeles to build plant costing $1,500,000.

Edgar M. Queeny elected vice president in charge of sales, Monsanto.

Henry Howard re-elected president, A. I. Ch. E.

J. T. Baker Chemical increases capital from $50,000 to $500,000.

H. Gardner McKerrow, formerly National Aniline, joins Hazard Advertising Corp.

Elmer Bobst elected treasurer, Hoffmann-LaRoche.

American Cellulose & Chemical, Amcelle, Md., re-opens plant.

Stauffer Chemical to erect plant in Calif. for production alumina.

Senator Norris offers amendment to War Department appropriation bill, calling for $2,000,000 for improvement Nitrate Plant No. 1 at Muscle Shoals.

State of Chemical Trade

Current Statistics (Dec. 31, 1937)—p. 1

WEEKLY STATISTICS OF BUSINESS

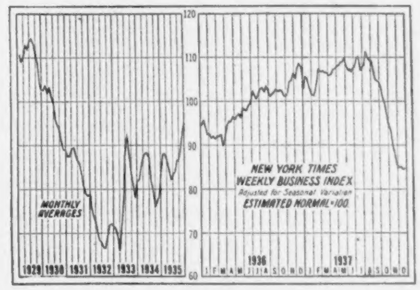
Week Ending	Carloadings 1937	Carloadings 1936	Carloadings % of Change	Electrical Output* 1937	Electrical Output* 1936	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Nov. 27	558,627	680,300	—19.9	2,065,378	2,196,175	— 6.0	80.5	96.4	61.6	73.2	79.9	79.2	79.6	29.6	85.7	117.6
Dec. 4	623,337	745,295	—16.4	2,152,643	2,133,511	+ 0.9	80.4	96.5	63.9	73.1	79.9	78.7	79.4	27.5	85.0	118.2
Dec. 11	622,131	739,096	—15.7	2,196,105	2,243,916	— 2.1	80.0	95.5	63.9	73.1	79.9	78.5	78.9	27.4	85.3	118.6
Dec. 18	603,292	730,048	—17.4	2,202,200	2,278,303	— 3.3	79.5	95.5	62.4	72.9	79.8	78.0	79.1	23.5	84.6	119.2
Dec. 24	......	......	.....	....	....	.....	78.9	95.5	62.4	72.2	79.8	78.1	79.2	19.2	84.7	120.2
Dec. 31	......	......	.....	....	....	.....	78.8	...	...	...	...	...	...	25.6	...	....

* K.W.H., 000 omitted; † 1926-1928 = 100.0.

MONTHLY STATISTICS

	November 1937	November 1936	October 1937	October 1936	September 1937	September 1936
CHEMICAL:						
Acid, sulfuric (expressed as 50° Baumé, short tons. Bureau of the Census)						
Total prod. by fert. mfrs. ...	....	176,500	212,258	169,814	188,252	135,717
Consumpt. in mfr. fert.	....	175,052	166,031	163,265	143,929	120,370
Stocks end of month	....	....	76,403	74,604	71,658	72,971
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal.	18,179,320	20,170,272	18,786,249	22,086,895	17,219,395	16,892,972
Comp. denat. prod., wine gal.	4,127,664	5,556,989	7,846,286	7,893,330	4,805,340	2,144,764
Removed, wine gal.	4,266,603	5,955,957	8,272,345	8,847,612	4,649,040	2,068,815
Stocks end of mo., wine gal.	564,669	838,433	709,584	1,239,021	1,136,359	2,202,802
Spec. denat. prod., wine gal. ..	5,481,866	7,026,720	6,523,178	7,179,187	6,705,983	6,487,318
Removed, wine gal.	5,693,010	6,990,141	6,529,424	7,283,737	6,656,577	6,436,152
Stocks end of mo., wine gal.	554,777	472,483	765,029	442,294	778,597	553,268
Ammonia sulfate prod., tons *a*	50,234	63,059	62,806	63,422	68,990	59,694
Benzol prod., gals. *b*	7,472,000	9,633,000	9,610,000	9,729,000	10,765,000	9,140,000
Byproduct coke prod., tons *a*..	3,225,556	4,054,400	4,036,046	4,071,249	4,426,375	3,836,800
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	824,170	1,210,233	1,018,760	1,345,971	1,146,391	1,391,884
Sheets, ship., lbs.	736,726	1,082,963	1,109,000	1,252,723	1,239,549	1,169,101
Rods, prod., lbs.	185,891	301,738	174,950	338,480	242,412	285,998
Rods, ship., lbs.	158,721	246,133	258,351	271,598	365,340	261,513
Tubes, prod., lbs.	56,957	82,104	89,760	121,704	116,956	109,563
Tubes, ship., lbs.	82,920	91,254	102,257	123,949	87,017	101,765
Cellulose acetate, sheets, rods, tubes:						
Production, lbs.	782,929	1,437,526	919,432	1,461,782	1,223,848	1,203,823
Shipments, lbs.	678,319	1,312,766	962,702	1,315,752	1,102,419	1,027,173
Methanol (Bureau of the Census)						
Production, crude, gals.	423,315	520,722	423,792	511,541	404,112	429,500
Production, synthetic, gals. ...	3,562,372	3,417,755	3,532,091	3,278,052	3,018,333	2,695,591
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds.	2,257,102	3,199,265	2,788,158	3,241,972	2,956,369	3,156,414
Heavy goods, ship., linear yds.	1,351,823	1,894,251	1,828,913	2,166,053	2,005,416	2,075,386
Pyroxylin spreads, lbs. *c*	3,762,146	5,320,813	4,944,517	6,080,964	5,481,218	6,086,557
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*	$11,521	$8,724	$12,893	$10,851	$11,288	$9,642
Crude sulfur *d*	$865	$691	$1,831	$807	$1,050	$1,000
Coal-tar chemicals *d*	$991	$864	$1,073	$980	$1,215	$1,021
Chemical specialties *d*	$2,216	$1,558	$2,459	$1,970	$2,396	$1,627
Industrial chemicals *d*	....	$1,564	$2,568	$1,987	$2,099	$1,827
Imports						
Chemicals and related prod. *d*	$7,804	$6,256	$8,506	$7,719	$7,339	$5,840
Coal-tar chemicals *d*	$1,229	$1,286	$1,948	$1,330	$1,609	$1,180
Industrial chemicals *d*	$2,033	$1,665	$1,745	$1,741	$1,612	$2,116
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100)						
Chemicals and allied prod., including petroleum	132.0	114.7	137.5	114.4	139.0	112.0
Other than petroleum	129.5	113.3	116.1	113.9	137.7	110.6
Chemicals	141.6	127.5	150.6	124.7	150.9	120.1
Explosives	106.0	98.3	110.5	96.2	106.4	89.3
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100)						
Chemicals and allied prod., including petroleum	122.4	119.7	126.5	120.3	128.6	119.5
Other than petroleum	122.1	119.4	126.7	120.2	128.9	118.8
Chemicals	129.6	130.0	135.2	129.9	137.4	127.1
Explosives	95.4	95.4	97.3	93.2	93.2	91.4
Stocks of chemicals, etc.:**						
Finished	....	120	147	123	149	125
Raw material	....	110	122	107	108	95
FERTILIZER:						
Exports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	....	....	200,182	194,237	125,329	164,332
Ammonium sulfate	....	....	10,447	7,735	7,607	4,704
Total phosphate rock	....	....	136,155	125,299	82,682	131,359
Total potash fertilizers	....	....	3,276	6,400	10,239	9,726

INDUSTRIAL TRENDS



Business: Recession one of the sharpest in nation's history. Production estimated as having fallen 30% in 12 months, against 53% in 1929-32. Foreign trade showed a 31% gain. Despite last quarter recession volume of production and trade during '37 was 5% above '36 level, according to Federal Reserve Bank of N. Y.

Commodity Prices: Standard Statistics estimates a 37% decline from high April 5 to Nov. 24.

Security Markets: Two-year bull market terminated March 10 with an average high of 131.52. Low point, 97.27 on October 19. New public offerings declined 40% in '37. Stocks are estimated to have declined 5.3% in December and 39.6% in '37. Chemical stocks have declined more than a billion dollars from their high point.

Steel: Seventeen consecutive weeks of decline brings rate to 19.2%. Rate, with but 2 exceptions, is lowest since American Iron and Steel Institute initiated weekly reports in October, '33. Yet '37 steel ingot production, estimated at 50,250,000 gross tons, is expected to be second best year on record (50,325,400 tons in 1928).

Employment: Nearly 570,000 lost jobs in November, but total unemployed was only 4,000 fewer than in November, 1936. Census of the unemployed shows 12% of the nation's adult population (7,882,912) jobless.

Farm Income: An indicated $8,500,000,000 income, a gain of about $1,000,000,000 over a year ago.

Railway Income: November income for Class 1 roads was 55.2% below that for same month in '36.

Tires: Production for first 11 months was 52,313,000 units, as contrasted with

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CHEMICAL INDUSTRIES

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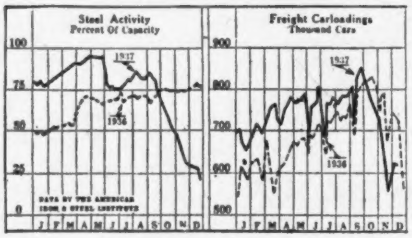
52,805,000 units for the same period of last year. Sharp decline in consumption of crude rubber since June is certain to have lowered total for year from 5% to 7% below '36 total of 574,000 tons.

Federal Debt: Rose $2,933,000,000 in '37 and stood at approximately $36,691,716,115 on Dec. 31. Rise in past year not as great as in '36.

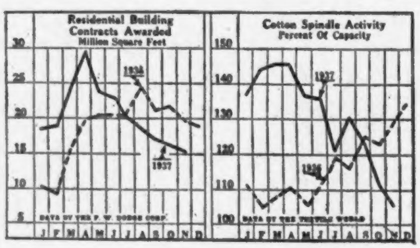
Dividends: The '37 total was $4,550,460,671, largest since '30, and compares with $4,122,725,360 in preceding year and with $4,982,668,635 in '30.



Standard Statistics Co.

Paper: Despite a sharp recession in sales in the latter half of '37, production of all types of paper just about equalled the record-breaking year of '36 and may have topped '36 by 1 or 2%. December operations were about 35% below same month a year earlier.

Carloadings: Final weeks of December showed sharp declines from corresponding weeks of '36, but total for year was 5.4% ahead of '36. Freight carloadings in the first quarter of '38 are expected to be about 8.3% below actual loadings in the same period in '37. An 18.6% decline in chemicals and explosives is anticipated.



Standard Statistics Co.

Gasoline: Consumption broke all records in '37, and unless there is a prolonged recession a gain of at least 6% is anticipated in '38.

Outlook: Confused. Administration assumes a new belligerent attitude towards so-called "big business," in striking contrast to supposed spirit of cooperation mentioned earlier. Consensus of opinion appears to favor a mild improvement in the first quarter of '38, based principally on premise that inventories have been greatly depleted. Supporting this theory most indices of business activity in final weeks of December showed a tendency towards "leveling off" and in some cases a slight gain was reported.

MONTHLY STATISTICS (cont'd)

FERTILIZER (cont'd)	November 1937	November 1936	October 1937	October 1936	September 1937	September 1936
Imports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	....	....	174,719	187,096	158,753	81,068
Ammonium sulfate	....	....	3,075	33,684	4,752	4,073
Sodium nitrate	....	....	3,216	21,855	6,132	1,549
Total potash fertilizers	....	....	105,237	64,923	98,194	36,188
Superphosphate e (Nat. Fert. Association)						
Production, bulk	324,514	331,384	333,553	308,537	303,030	252,027
Shipments, total	179,112	160,924	227,368	256,995	231,535	215,925
Northern area	96,182	70,771	132,543	141,814	304,692	309,861
Southern area	82,930	90,153	94,825	115,181	81,251	77,060
Stocks, end of month, total ..	1,607,475	1,330,893	1,416,946	1,093,265	1,275,151	990,017
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	123,465	99,916	146,913	170,432	225,975	257,869
Total, 12 southern	122,888	99,697	126,587	137,441	135,018	145,822
Total, 5 midwest	577	219	20,326	32,991	90,957	112,047
Fertilizer payrolls	78.3	63.1	83.2	69.7	97.2	76.1
Fertilizer employment	75.5	69.8	81.5	76.9	84.6	77.9
Value imports, fert. and mat. *d*	$3,633	$2,391	$3.689	$3,760	$3,311	$1,653
Value exports, fert. and mat. *d*	$1,952	$1,357	$1,736	$1,985	$1,550	$1,435

GENERAL:

Acceptances, outst'd'g *f*	$348	$349	$346	$330	$344	....
Coal prod., anthracite, tons ..	3,694,322	3,783,385	4,579,000	4,608,000	3,507,000	3,874,000
Coal prod., bituminous, tons..	....	....	40,722,000	43,321,000	39,055,000	....
Com. paper outst'd'g *f*	$311	$191	$323	$199	$331	$197
Failures, Dun & Bradstreet ...	786	688	768	611	564	586
Factory payrolls *i*	89.3	90.5	100.2	89.0	100.1	83.4
Factory employment *i*	94.7	96.7	100.4	96.7	102.1	95.3
Merchandise imports *i*	$223,226	$196,400	$224,391	$212,692	$233,361	$215,701
Merchandise exports *i*	$314,682	$225,766	$336,136	$264,708	$296,729	$277,695

GENERAL MANUFACTURING:

Automotive production	360,063	394,890	329,876	224,688	171,203	135,165
Boot and shoe prod., pairs ...	21,040,906	30,432,839	28,950,814	39,361,698	33,616,864	40,974,713
Bldg. contracts, Dodge *j*	$198,465	$208,204	$202,081	$225,768	$207,087	$234,272
Newsprint prod., U. S., tons ..	79,338	79,853	78,352	81,027	77,635	72,216
Newsprint prod., Canada, tons	302,236	285,771	314,594	301,106	312,351	269,782
Plate glass prod., sq. ft.	12,517,311	13,083,963	14,854,910	20,752,657	16,479,144	19,552,775
Steel ingot prod., tons	2,153,781	4,323,025	3,392,691	4,534,246	4,301,869	4,151,388
% steel activity	38.22	76.94	58.31	78.15	76.52	74.05
Pig iron prod., tons	2,006,724	2,947,365	2,892,629	2,991,887	3,410,371	2,730,293
U. S. consumpt. crude rub., tons	33,984	50,433	38,707	49,637	43,893	46,449
Cotton consumpt., bales	485,000	627,000	526,464	651,086	601,837	630,000
Cotton spindles oper.	22,791,550	23,805,520	23,724,272	23,662,464	23,886,948	23,518,904
Silk deliveries, bales	31,749	....	36,002	....	36,376	....
Rayon ship. index *p*	252	714	366	699	560	713
Rayon employment *i*	374.0	364.0	387.5	361.5	407.1	366.3
Rayon payrolls *i*	360.3	298.2	391.0	307.6	393.6	286.6
Soap employment *i*	99.9	102.5	102.8	107.1	103.1	108.6
Soap payrolls *i*	115.5	101.6	121.1	105.3	122.1	102.9
Paper and pulp employment *i*.	113.3	111.9	117.3	110.7	119.1	94.4
Paper and pulp payrolls *i*	105.4	104.5	116.7	101.9	117.6	95.9
Leather employment *i*	82.6	98.4	89.6	97.2	92.5	98.0
Leather payrolls *i*	82.4	100.8	95.0	99.0	98.6	100.6
Glass employment *i*	106.7	97.6	109.9	103.6	111.1	97.4
Glass payrolls *i*	111.6	99.4	119.2	103.0	118.7	92.6
Rubber prod. employment *i* ..	92.1	100.0	97.7	97.9	98.0	90.2
Rubber prod. payrolls *i*	83.3	101.2	94.3	96.8	97.4	85.4
Dyeing and fin. employment *i*.	108.9	117.8	112.2	114.8	110.5	104.0
Dyeing and fin. payrolls *i*	89.0	100.6	94.6	97.7	94.9	88.7

MISCELLANEOUS:

Oils and Fats, price index	93.1	114.2	97.2	112.2	103.9	112.8
Price index K, rosin	102.6	119.6	119.6	102.3	132.2	100.7
Gasoline prod., bbls.	....	....	52,461,000	45,905,000	49,561,000	44,483,000
Cottonseed oil consumption ..	....	....	....	....	....	....
Price index, turpentine	51.9	73.5	53.2	70.1	58.2	71.8
Portland cement, prod. *v*	....	10,977	11.374	12,470	11,233	12,347
Shipments *v*	....	8,942	11,190	13,089	12,773	12.619
Stocks, end of month *v*	....	20,117	21,572	18,079	21.388	18,738
% capacity	....	....	52.0	56.0	53.1	....

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of the month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100; *j* 000 omitted, 37 states; *p* Rayon Organon, 1923-25 = 100; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce.

Stock Values Declined in '37

Two-year Bull Market Halted Last Spring—Values Declined Rapidly in Final Quarter—Chemical Group Depreciated $1,880,915,177 From High Point—

Stock values declined in December, although the depreciation was not as great as in the preceding month. According to the compilation of *The New York Sun*, prices dropped an average of 3.8% and the depreciation for 225 representative issues aggregated $956,713,146. All groups declined, with the exception of the rail equipment, chemicals, and mining shares, which gained 2.3%, 1.05%, and 1% respectively.

The outstanding developments in the stock market in '37 were (1) termination of the bull market which had been in progress for but one week short of two full years (2) drastic decline in speculative activity, particularly in the 4 summer months (3) a decline of about 40% in the rate of new public offerings.

The following comparison of 3 leading chemical common stocks indicates what happened to values in 1937:

	1936-'37 High	Close 1936	Dec.31 1937
Allied Chemical	258½	226½	162½
du Pont	184¾	173	112
Union Carbide & Carbon	111	103¾	73½

It has been estimated that the value of the stocks of 10 companies in the chemical field (using the term chemical in its narrowest and strictest sense) has declined well over a billion dollars from the high point of '37. Since the chemical stocks changed as a group very little one way or another during December, a comparison of values of the chemical group on the N. Y. Stock Exchange on Jan. 1, '37, Feb. 1, '37, and Dec. 1, '37, is illuminating. The Feb. 1 date is selected because the chemical group had the highest average value in January for the entire year in contrast with all the groups as a whole. It must also be borne in mind that the chemical group as defined by the N. Y. Stock Exchange grouping is much more inclusive and broad in its interpretation.

	Total Value	Average Value
Jan. 1, 1937	$6,502,237,633	$79.60
Feb. 1, 1937	6,649,478,222	81.40
Dec. 1, 1937	4,768,563,045	54.84

From the above it appears that the chemical group declined in value $1,733,674,588 when comparison is made between Jan. 1 and Dec. 1 and declined $1,880,915,177 between Feb. 1 and Dec. 1. The average value dropped $24.76 when comparison is made between Jan. 1 and Dec. 1 and $26.56 between Feb. 1 and Dec. 1. Roughly the chemical group lost a third of its value when the average values are compared.

Official Figures

Official figures for December were released by the N. Y. Stock Exchange on Jan. 5, showing a net depreciation of $1,846,891,565 for the whole list. The average price declined from $28.92 to $27.53. The net loss in November was $4,117,183,130.

The net value of the chemical group on Jan. 1, '38, was $4,740,707,834, as compared with $4,768,563,045 on Dec. 1, a net loss of $27,855,211 for the month. The net decline in Nov. amounted to $473,046,925. The average value of the chemical group showed a net loss of only $0.36 in Dec., the respective end of the month figures being $54.84 on Dec. 1 and $54.48 on Jan. 1.

Price Trend of Representative Chemical Company Stocks

	Nov. 30	Dec. 4	Dec. 11	Dec. 18	Dec. 24	Dec. 31	Net Gain or loss last mo.	Price on Dec. 31, 1936	1937 High	1937 Low
Air Reduction	50	52¼	51¾	52¼	53¾	49½	— ½	78	80¼	44½
Allied Chemical	155½	160¾	162	162	169	162½	— 7	226½	258½	145
American Cyanamid	23	23⅜*	23⅞†	22⅞	22⅞	22⅞	— ⅛	36	37	17⅝
Amer. Agric. Chem.	62	62	60¾	57	...	58	— 4	84½	101½	53½
Columbian Carbon	73	74	70½	66	...	67	— 6	120	125¾	65
Commercial Solvents	9⅛	9	7⅞	7⅜	7⅛	7⅜	— 1¾	18¾	21¼	5
Dow Chemical	87	90	89⅜	100⅜	96	91	+ 4		159¼	79½
Du Pont	112	118¼	115¼	115⅛	117⅛	112	....	173	180⅛	98
Mathieson Alkali	24¾	25	24½	23½	23¼	22¾	— 2	40½	41¼	22
Monsanto Chemical	76	81	85	86½	86	84	+ 8	98	107½	71
Std. of N. J.	45	45½	44½	45¼	46	45¼	+ ¼	68¾	76	42
Texas Gulf Sulphur	30⅜	30½	29½	27	27¼	27¼	— 3⅛	39¼	44	23¾
Union Carbide	71	72¾	74⅝	75½	75⅛	73½	+ 2½	103¾	111	61¼
U. S. Ind. Alcohol	20¾	21	21⅝	21	21	21	+ ¼	38¾	43⅝	16⅛

* Friday, Dec. 3; † Friday, Dec. 10.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1937	Net income 1936	Common share earnings 1937	Common share earnings 1936	Surplus after dividends 1937	Surplus after dividends 1936
Armour & Co. of Delaware: Year, October 30	....	$12,417,019	$7,458,331	...	...	......	......
Armour & Co. of Illinois: Year, October 30	y$.70	9,712,792	10,239,462	$.62	$.74	......	......
Climax Molybdenum Co.: Nine months, Sept. 30	y1.30	5,338,187	....	2.12	...	......	......

y Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Abbott Labs., pf.	46½c	Jan. 3	Jan. 15
Air Reduction, ext.	25c	Dec. 31	Jan. 15
Air Reduction, q	25c	Dec. 31	Jan. 15
Canadian Celanese	40c	Dec. 17	Dec. 31
Canadian Ltd., pf., q	$1.75	Dec. 17	Dec. 31
Celanese Corp., 7% pr. pf., q	$1.75	Dec. 15	Jan. 1
Celanese Corp., 7% pt. pf., s	$3.50	Dec. 15	Dec. 31
Celanese Corp.	(action deferred Dec. 6)		
Colgate-Palmolive-Peet, pf., q	$1.50	Dec. 6	Jan. 1
Continental Diamond Fibre	(no action Dec. 1, '37)		
Corn Prods. Refg., q	75c	Jan. 3	Jan. 20
Corn Prods. Refg., pf., q	$1.75	Jan. 3	Jan. 15
Devoe & Raynolds, A & B, q	75c	Dec. 20	Jan. 1
Devoe & Raynolds, pfd., q	$1.75	Dec. 20	Jan. 3
Dom. Tar & Chem., pf., q	$1.37½	Jan. 14	Feb. 1
Du Pont, $4.50 pf.	$1.12½	Jan. 10	Jan. 25
Du Pont, deb., q	$1.50	Jan. 10	Jan. 25
Eagle Picher Lead, pf., q	$1.50	Dec. 15	Jan. 2
Freeport Sulphur, pf. q	$1.50	Jan. 13	Feb. 1
General Paint, q	25c	Dec. 17	Jan. 1
General Paint, pf., q	67c	Dec. 17	Jan. 1
Glidden, q	50c	Dec. 17	Jan. 3
Glidden, pf., q	56¼c	Dec. 17	Jan. 3
Great Western Electro. Chem., pf., q	30c		Jan. 1
Hercules Powder pf., q	$1.50	Feb. 4	Feb. 15
Industrial Rayon	25c	Dec. 20	Jan. 3
Int. Nickel of Can., ext.	25c	Dec. 1	Dec. 31
Int. Nickel of Can.	50c	Dec. 1	Dec. 31
Int. Nickel of Can., pf., q	$1.75		Feb. 1
Jones & Laughlin, 7% pf.	(no action Dec. 15, 1937)		
Liquid Carbonic, q	40c	Dec. 18	Jan. 3
MacAndrews & Forbes, ext.	50c	Dec. 31	Jan. 15
MacAndrews & Forbes, q	50c	Dec. 31	Jan. 15
MacAndrews & Forbes, pf., q	$1.50	Dec. 31	Jan. 15
Merck & Co., pf.	$1.50	Dec. 18	Jan. 1
Monsanto Chem., pf., A, s	$2.25	May 10	June 1
Monroe Chemical, pf., q	37½c	Dec. 14	Jan. 1
Nat. Lead Co., pf., B, q	$1.50	Jan. 21	Feb. 1
Paraffine Co., pf., q	$1.00	Jan. 3	Jan. 15
Parker Rust Proof, q	37½c	Feb. 10	Mar. 1
Procter & Gamble, 8% pfd., q	$2.00	Dec. 24	Jan. 15
Pure Oil, 6% pf., q	$1.50	Dec. 10	Jan. 1
Pure Oil, 5¼% pf., q	$1.25	Dec. 10	Jan. 1
Shell Union, pf., q	$1.37½	Dec. 15	Jan. 3
Sherwin-Williams of Can., pf., ac	$1.75	Dec. 15	Jan. 3
Spencer Kellogg, q	40c	Dec. 15	Dec. 31
Staley, A. E., 7% pf., s	$3.50	Dec. 20	Jan. 1
Std. Oil of Ohio, pf., q	$2.25	Dec. 31	Jan. 15
Texas Corp., q	50c	Dec. 10	Jan. 2
Tubize Chatillon, 7% pf.	$1.75	Dec. 20	Jan. 3
Union Carbide	80c	Dec. 3	Jan. 1
United Dyewood, q	25c	Dec. 10	Jan. 3
United Dyewood, pf., q	$1.75	Dec. 10	Jan. 3
U. S. Smelt., Ref. & Mining	$1.00	Dec. 10	Jan. 15
U. S. Smelt., Ref. & Mining, q	87½c	Dec. 12	Jan. 15
Vulcan Detinning, pf., q	$1.75	Jan. 10	Jan. 20

s (semi-annual).

Chemical Finances
Dec. 1937—p. 2

Chemical Stocks and Bonds

Dec. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales: Number of shares Dec. 1937	Sales: Number of shares 1937	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1936	Earnings** $-per share-$ 1935
NEW YORK STOCK EXCHANGE														
49½	80¼	44½	86⅛	58	57½	35	54,500	324,700	Air Reduction	No	2,579,391	$3.00	2.79	2.10
162½	258½	145	245	157	173	125	22,000	198,200	Allied Chem. & Dye	No	2,214,099	7.50	11.44	8.71
58	101½	53½	89	49	57¾	41½	5,300	64,600	Amer. Agric. Chem.	No	210,932	7.75	4.71	6.37
11	30¾	8¼	35⅛	20½	35¾	22½	20,600	240,100	Amer. Com. Alcohol	20	260,930	.50	4.55	3.16
23	46	22	50	37	52	36	8,300	60,000	Archer-Dan.-Midland	No	549,546	2.00	3.05	3.46
40¼	94	38	84	48	48½	32¾	1,200	40,900	Atlas Powder Co.	No	249,827	2.25	4.21	2.81
101	133	101	131	112	115	106¾	110	2,390	5% conv. cum. pfd.	100	68,597	5.00	20.85	16.93
14⅛	41¼	13	32¼	21¾	35⅜	19½	25,150	179,650	Celanese Corp. Amer.	No	1,000,000	2.25	2.33	1.99
90	115	90	116	106	111¼	97½	300	12,700	prior pfd.	100	164,818	7.00	27.25	35.34
9	25¾	8½	21¼	13	21	15⅛	78,600	830,800	Colgate-Palm.-Peet	No	1,999,970	.50	1.40	1.36
96	104½	95	106½	100	107¼	101	3,000	18,900	6% pfd.	100	248,197	6.00	17.13	16.79
67	125¾	65	136½	94	101¼	67	9,500	67,600	Columbian Carbon	No	537,406	6.50	7.48	5.56
7⅜	21¼	5	24⅝	14¼	23⅞	16⅛	218,500	1,351,100	Commercial Solvents	No	2,636,878	.60	.85	1.02
59	71¼	50½	82½	63⅝	78⅜	60	42,800	332,900	Corn Products	25	2,530,000	3.00	3.86	2.62
166½	171½	153	170	158	165	148¼	1,400	10,900	7% cum. pfd.	100	245,738	7.00	46.76	33.97
29½	76⅛	29½	63	42	50⅜	35⅛	1,200	20,100	Devoe & Rayn. A	No	95,000	3.25	4.49	2.89
91	159¼	79½	142¼	94⅛	105½	80½	5,500	40,900	Dow Chemical	No	945,000	3.35	4.42	3.43
112	180⅛	98	184¾	133	146½	86⅝	90,200	560,300	DuPont de Nemours	20	11,041,437	6.25	7.54	5.04
110	112	107½	...	...	...	...	2,500	8,500	4½% pfd.	No	500,000	4.50	.....	...
131⅜	135½	130	136⅛	129	132	126⅜	3,400	27,500	6% cum. deb.	100	1,092,948	6.00	82.24	56.81
160½	198	144	185	156	172¼	110⅛	14,800	161,400	Eastman Kodak	No	2,250,921	7.50	8.23	6.90
156	164	150	166	152	164	141	190	3,710	6% cum.	100	61,657	6.00	306.64	258.09
21½	32¼	18	35⅝	23⅛	30⅝	17⅛	12,300	355,500	Freeport Texas	10	796,380	1.50	2.43	1.78
105¾	117	102	135	108	125	112⅛	210	3,230	6% conv. pfd.	100	12,301	6.00	163.39	121.30
9¼	19	8½	18	9½	10⅝	4⅜	7,200	79,000	Gen. Printing Ink	1	735,960	1.20	1.32	.....
20¼	51½	19⅛	55⅛	39½	49½	23⅜	14,200	279,800	Glidden Co.	No	800,060	2.60	3.29	2.91
48	58⅛	43	56	52¼	...	...	1,400	23,700	4½% cum. pfd.	50	199,940	2.25	15.43	.....
93½	117½	80⅛	133	99⅝	119⅛	85	1,000	27,500	Hazel Atlas	25	434,474	6.56	6.55	7.58
52	92½	50	75	42	45	35½	14,200	57,900	Hercules Powder	No	592,527	2.62	3.24	2.12
125	135½	125	135	126	131	122	130	3,140	6% cum. pfd.	100	96,194	6.00	50.09	36.30
16⅛	47½	15	41⅜	25⅝	36⅜	23½	23,000	466,000	Industrial Rayon	No	759,325	2.00	2.24	1.00
22½	64¼	20	48	37	42¾	21½	72,400	60,400	Interchem.	No	289,058	2.00	3.02	2.74
92	111½	92	112	107	110	98½	120	3,670	6% pfd.	100	66,917	6.00	18.97	17.19
2½	9⅛	2	5⅜	2⅞	5	2½	17,700	732,800	Intern. Agricul.	No	438,048	.....	—1.55	—.99
19½	63½	18¼	47¼	22¼	42¾	26	2,200	128,200	7% cum. pr. pfd.	100	100,000	3.00	.23	2.69
44⅜	73⅜	37	66⅜	43¼	47¼	22⅛	363,600	2,920,900	Intern. Nickel	No	14,584,025	2.25	2.40	1.65
20	28¾	19½	30	23	36¼	25	500	17,900	Intern. Salt	No	240,000	1.75	1.65	1.32
20	36	19¼	36¾	29¼	36¼	31	900	23,500	Kellogg (Spencer)	No	500,000	1.60	2.62	2.22
34⅛	79	33⅝	80¼	47¼	49¼	21⅛	37,000	372,300	Libbey Owens Ford	No	2,506,117	4.00	4.14	3.26
17½	26⅞	14	46½	32½	37¼	24½	12,300	169,900	Liquid Carbonic	No	700,000	2.75	1.58	1.29
22¾	41¾	22	42⅜	27½	33⅞	23⅜	14,400	138,800	Mathieson Alkali	No	830,428	1.65	1.76	1.44
84	107½	71	103	79	94¾	55	11,800	144,500	Monsanto Chem.	No	1,114,388	3.00	4.01	3.84
109	109	105	...	...	...	...	400	1,400	4½% pfd.	No	50,000	4.50	.....	.....
26⅞	44	18	36½	20⅜	20⅝	.14⅝	49,100	547,700	National Lead	10	3,098,310	.50	1.71	1.08
156⅛	171	153	171	155	162½	150	800	6,800	7% cum. "A" pfd.	100	243,676	7.00	33.83	25.40
136½	150	127	147	137⅜	140½	121⅛	100	2,250	6% cum. "B" pfd.	100	103,277	6.00	74.50	49.05
12¾	41¾	10⅛	40	9	10⅞	4⅜	56,100	979,200	Newport Industries	1	519,347	.50	.98	.57
60½	103¾	51⅛	82	64	64½	40	34,200	208,300	Owens-Illinois Glass	12.50	2,661,204	4.00	3.80	3.29
46	65½	43¼	56	40¼	53¾	42⅜	27,700	301,900	Procter & Gamble	No	6,325,087	2.75	2.39	2.32
118½	118½	114½	122⅛	115¾	121	115	780	6,240	5% pfd.	100	169,517	5.00	94.14	88.15
16⅝	34¾	14⅞	28¼	14¾	16⅓	5½	22,200	579,100	Shell Union Oil	No	13,070,625	1.00	1.58	.....
96¾	105⅜	91	127½	102	111	63⅛	2,800	64,000	5½% cum. pfd.	100	379,798	5.00	65.49	.....
27¼	60⅝	26½	47⅜	19½	20½	6½	12,700	265,400	Skelly Oil	No	1,006,348	1.50	4.42	.....
88¾	102¼	88	132	97⅝	116¼	60	800	18,000	6% cum. pfd.	100	66,300	6.00	73.16	.....
33⅛	50	26½	48½	32¾	33⅜	23	68,200	746,000	S. O. Indiana	25	15,235,323	2.30	3.09	.....
45¼	76	42	70⅜	51⅛	52⅜	35¾	267,000	2,068,100	S. O. New Jersey	25	26,224,767	2.50	3.73	.....
6¼	15⅜	5¼	13	5⅝	8¾	4	13,700	596,900	Tenn. Corp.	5	853,696	.35	.41	.22
39¼	65⅛	34¾	55¼	28⅞	30¼	16½	289,200	2,875,000	Texas Corp.	25	10,873,559	2.25	4.10	.....
27¼	44	23¾	44¾	33	36¾	28⅜	27,300	883,800	Texas Gulf Sulphur	No	3,840,000	2.75	2.57	1.94
73½	111	61¼	105¼	71⅝	75¾	44	152,700	834,400	Union Carbide & Carbon	No	9,000,743	3.20	4.09	3.06
39¾	91	36¾	96¾	68	78	46	25,700	111,400	United Carbon	No	397,885	4.50	5.54	4.71
21	43⅝	16⅛	59	31¼	50⅝	35⅛	33,100	436,800	U. S. Indus. Alc.	No	391,238	.....	—.20	2.16
14½	39⅜	9¼	30⅝	16¼	21¼	11¼	27,200	791,800	Vanadian Corp. Amer.	No	376,637	1.00	.40	—1.13
3⅜	12¾	2⅜	8½	4⅜	4⅝	2½	11,300	931,700	Virginia-Caro. Chem.	No	486,708	.....	—2.44	—.79
22½	74⅜	18½	58¾	28¼	35¾	17½	13,300	311,900	6% cum. part. pfd.	100	213,392	1.50	.44	4.20
12⅛	27¼	10¾	32	19¾	25½	16¾	6,200	68,800	Westvaco Chlorine	No	339,362	1.00	1.39	1.63
21⅛	34⅞	21⅛	35¼	31¼	...	...	2,300	34,300	Westvaco Chlorine, cum. pfd.	30	192,000	1.50	3.26	.....
NEW YORK CURB EXCHANGE														
22⅞	37	17⅝	40¾	29¼	30	15	53,000	685,900	Amer. Cyanamid "B"	10	2,454,425	.60	1.77	1.61
1⅛	2⅞	1	3¾	2⅛	4	2	800	20,900	British Celanese Am. R.	10/	4,222,667	.....	—4.53%	—.71
69	124	69	116¼	99¾	115	90	850	14,300	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	24.47	21.96
4½	15	3	16½	9	15	7	900	17,000	Celluloid Corp.	15	194,951	.....	—.80	—.95
11⅞	14⅝	10½	15	11⅞	14½	11⅛	300	9,700	Courtaulds' Ltd.	£1	24,000,000	9½%	8.40%	7.51%
8	10⅝	3½	10¾	5	12½	6⅛	6,100	74,600	Duval Texas Sulphur	No	500,000	.....	.61	.16
35	47½	31	55	39	58	37	1,100	15,700	Heyden Chem. Corp.	100	150,000	2.50	3.56	3.22
85¾	147½	77	140	98¼	97¼	46¾	17,260	90,700	Pittsburgh Plate Glass	25	2,142,443	6.50	7.15	5.32
84	154¾	72¼	154½	117	128⅞	84	4,200	71,950	Sherwin Williams	25	633,927	6.00	8.04	6.19
108	114	106¼	116	110	113½	106	470	3,630	5% cum. pfd.	100	137,139	5.00	41.44	33.17
PHILADELPHIA STOCK EXCHANGE														
140	179	115	179	114¾	116¼	76½	275	8,650	Pennsylvania Salt	50	150,000	8.75	8.57	7.74

Dec. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales Dec. 1937	Sales 1937	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE													
104¼	109½	99	117½	107¾	116	104½	271,000	4,683,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M-N	$25,300,000
28½	42½	23	42½	27½	29¾	7⅜	239,000	2,507,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5	J	12,067,000
102⅞	102⅞	100⅛	...	...	...	...	21,000	288,000	Dow Chemical	1951	3	J-D	5,000,000
100⅛	102	98½	102¾	96¾	100¼	91⅛	59,000	446,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M-N	5,633,000
29¼	35⅜	21¼	46	25	25½	7	382,000	2,681,000	Lautaro Nitrate n inc. deb.	1975	4	J-D	30,590,000
20½	25½	20½	35	23⅛	38	32⅛	8,000	37,000	Ruhr Chem. 6's	1948	6	A-D	1,500,000
98¼	102	93	101¼	94¼	...	..	305,000	8,241,000	Shell Union Oil	1951	3½	M-S	58,800,000
97	102¾	94	102⅞	96⅝	...	..	76,000	2,255,100	Skelly Oil	1951	4	J-J	9,000,000
97	105	93½	105	103	104	91⅛	32,000	342,000	Tenn. Corp. deb. 6's "B"	1944	6	M-S	1,600,000
105¾	105¾	100	106	101½	...	..	289,000	7,696,000	Texas Corp.	1951	3½	J-D	60,000,000
81	111	81	98⅛	85¾	94¼	66	69,000	1,778,000	Vanadium Corp. conv. 5's	1941	5	A-O	2,800,000

* Paid in 1937, including extras but excluding dividends paid in stock. ** For either fiscal or calendar years.

ETHYL ALCOHOL[1]

Production. Production of ethyl alcohol amounted to 223,181,228 proof gals., compared with 196,126,236 in '36, and 180,645,920 in '35. The '37 production exceeded largest previous figure, 202,616,750 proof gals. in '29, by about 10%.[2]

Withdrawals. Withdrawals were 7,960,405 proof gals. less than production and amounted to 215,220,823 proof gals., compared with 199,938,800 in '36, 183,095,759 proof gals. in '35, and 191,376,549 in '29.[3] Withdrawals for '37 exceeded figure for '29 by 23,844,274 proof gals.[3]

An analysis of withdrawals in '37 shows that 32,289,650 proof gals. were withdrawn upon payment of tax, and 182,931,173 were withdrawn tax-free. Tax-free withdrawals were for the following purposes: 179,324,373 for denaturation, 1,764,740 for hospital and scientific use, 1,041,828 for use of the U. S. and subdivisions, 163,156 for export, and 637,076 for medicinal, beverage, and other authorized uses in Puerto Rico.

Withdrawals of ethyl alcohol on payment of tax in the fiscal year '37 amounted to 32,289,650 proof gals., an increase of 8,237,118 over previous fiscal year and represented 15.0% of total withdrawals, compared with 12.0% in '36.

Withdrawals of ethyl alcohol for tax-free purposes in '37, amounting to 182,931,173 proof gals., represented an increase of 7,044,905 proof gals. over '36, and 16,826,386 over '35. Increase in tax-free withdrawals was largely for production of denatured.

Number of plants. Three new alcohol plants began operations during the past year, one each in Indiana, Louisiana, and Washington, and in addition, one each in Illinois, Indiana, and Louisiana resumed operations. One experimental plant began operations in New Jersey. Two plants which had operated in '36 were discontinued and 3 others suspended operations in '37. Largest producing states in '37, as in '36, were Pennsylvania, New Jersey, Louisiana, and Maryland, in order named. Production of these 4 states was equal to 66.6% of the total in '37, compared with 68.1% of total in '36, and 79.6% of total in '35.

Materials used. Amount of molasses used increased from 173,385,873 gals. in '36 to 202,631,056 in '37, while consumption of corn and other grains increased from 180,350,892 lbs. to 232,658,007 lbs. Relative production of alcohol from various materials in '37 follows: from molasses, 75.7%; from ethyl sulfate, 15.2%; from grain, 8.4%; and from miscellaneous materials, 0.7%. While actual production from each of these classes of materials was greater in '37 than in '36, the percentage produced from grain increased and the percentages for each of the other 3 classes of materials were smaller in '37 than in '36.

[1] Data in proof gals. containing 50% alcohol by volume.
[2] Puerto Rico is included in each year's figures for production and withdrawals, but in '29, operations were reported for only 11 months.
[3] This is due to the withdrawal currently of large amounts of tax-paid alcohol for beverage purposes, a demand which did not exist in '29. In '29 tax-free withdrawals amounted to 182,484,301 proof gals., which compares with 182,931,173 withdrawn tax-free in '37.

DENATURED ALCOHOL*

Production. Production amounted to 102,202,659 wine gals. in fiscal year '37, compared with 101,477,843 in '36, and 97,031,074 in '35.

Withdrawals: Withdrawals amounted to 103,165,980 wine gals., compared with 100,519,677 in '36, and 96,703,993 in '35. Withdrawals in '37 consisted of 79,681,876 wine gals. of specially denatured alcohol, and 23,484,104 wine gals. of completely denatured, former representing an increase of 14,862,391 wine gals., and latter a decrease of 12,216,088 wine gals., compared with '36. Specially denatured constituted 77.2% of total withdrawals of denatured in '37, compared with 64.5% in '36, and 60.6% in '35.

Number of denaturing plants operated increased from 37 in '36 to 45 in '37. Number of bonded users of specially denatured alcohol operating increased from 4,267† in '36 to 4,323 in '37; and amount of denatured alcohol used (including the amount recovered and reused) increased from 109,525,613 wine gals. in '36 to 139,054,515 in '37.

* Data in wine gallons of approximately 190 proof.
† Revised figure.

Market Developments, etc.
July, '36—Dec., '37

Outstanding among the developments in the industrial alcohol field in period between July 1, '36 and Dec. 1, '37 was the introduction on

Fig. 1—Alcohol—Summary of Plants Operated, Bonded Warehouses, Materials Used: Fiscal Years, 1936-37

		1936	1937	Increase (+) or Decrease (—)
Number of plants operated[1]		35	38	+ 3
Number of bonded warehouses operated		72	73	+ 1
Operations (Proof gals.[2])				
Production		196,126,236	223,181,228	+ 27,054,992
Removed to bonded warehouses		195,981,119	222,828,218	+ 26,847,099
Withdrawals, total[3]		199,938,800	215,220,823	+ 15,282,023
Tax-paid		24,052,532	32,289,650	+ 8,237,118
Tax-free, total		175,886,268	182,931,173	+ 7,044,905
For denaturation[3]		172,478,748	179,324,373	+ 6,845,625
For hospital, scientific use		1,565,114	1,764,740	+ 199,626
For use of U. S. and subdivisions		993,734	1,041,828	+ 48,094
For export		135,498	163,156	+ 27,658
For medicinal, beverage, and other authorized uses in Puerto Rico		713,174	637,076	— 76,098
Losses in warehouses		438,851	528,194	+ 89,343
Losses in transit		47,877	39,871	— 8,006
Stocks in bonded warehouses June 30[4]		21,300,340	28,464,541	+ 7,164,201
Materials used				
Molasses	(gals.)	173,385,873	202,631,056	+ 29,245,183
Grain				
Corn	(lbs.)	141,068,809	198,467,734	+ 57,398,925
Malt	"	23,998,368	29,247,273	+ 5,248,905
Rye	"	15,280,971	4,598,838	— 10,682,133
Other	"	2,744	344,162	+ 341,418
Ethyl sulfate	(gals.)	24,402,700	25,492,675	+ 1,089,975
Sulfite liquor	"	7,396,855	12,060,125	+ 4,663,270
Pineapple juice	"	6,789,672	3,598,222	— 3,191,450
Cider	"	......	34,820	+ 34,820
Corn syrup	"	94,282	28,446	— 65,836
Fermented liquor	"	589,806	23,157	— 566,649
Manioca meal	(lbs.)	......	634,552	+ 634,552
Hydrol	"	402,379	......	— 402,379
Miscellaneous	"	23,151	58,845	+ 35,694

[1] Includes 1 experimental plant in '36 and 3 in '37; [2] A proof gallon contains 50% alcohol by volume; [3] Including 484 proof gals. in '36 and 194,606 in '37 transferred to denaturing plants by alcohol plants not having bonded warehouses; [4] Stocks in transit between bonded warehouses and quantities in receiving tanks of alcohol plants awaiting transfer to bonded warehouses not computed.

Fig. 2—Denatured Alcohol—Summary Plants Operated, Bonded Dealers and Manufacturers: Fiscal Years, 1936-37

	1936	1937	Increase (+) or Decrease (—)
	(Quantities in wine gallons[2])		
Denaturing Plants			
Number operated[3]	37	45	+ 8
Production, total	101,477,843	102,202,659	+ 724,816
Completely denatured	36,522,358	22,118,378	— 14,403,980
Specially denatured	64,955,485	80,084,281	+ 15,128,796
Withdrawals, total	100,519,677	103,165,980	+ 2,646,303
Completely denatured	35,700,192	23,484,104	— 12,216,088
Specially denatured	64,819,485	79,681,876	+ 14,862,391
Losses, total	100,136	102,950	+ 2,814
Stocks, June 30, total	2,706,623	1,657,131	— 1,049,492
Completely denatured	2,250,899	857,663	— 1,393,236
Specially denatured	455,724	799,468	+ 343,744
Bonded Dealers			
Number operating	67	67	......
Received[4]	3,682,183	3,997,465	+ 315,282
Removed[4]	3,707,471	3,979,208	+ 271,737
Losses in storeroom	3,191	3,915	+ 724
Stocks June 30	333,542	349,789	+ 16,247
Bonded Manufacturers			
Number operating	4,267[5]	4,323	+ 56
Received	65,169,881	79,354,231	+ 14,184,350
Recovered after use	44,866,780	60,744,887	+ 15,878,107
Total used	109,525,613	139,054,515	+ 29,528,902
Losses	62,889	103,903	+ 41,014
Stocks June 30	2,771,921	3,369,088	+ 597,167

[1] Including denatured rum; [2] In wine gallons of approximately 190 proof; [3] Includes one denaturing plant operated in conjunction with an experimental alcohol plant in '36 and two in '37; [4] Excluding inter-dealer shipments; [5] Revised figure.

Alcohol
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Alcohol

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Denatured Alcohol Production by Formulas

Formula[1]	Amount	Formula[1]	Amount
1	25,156,600	29	9,756,303
1-A	3,404	30	305,773
2-A	25,784	31-A	1,768
2-B	19,359,445	32	69,196
3-A	899,522	33	4,046
3-B	2,554	33-A	3
4	1,562,282	35	14,070
6-A	46,491	35-A	3,565,918
6-B	71,213	36	4,667
12-A	344,911	37	647,524
13-A	831,643	37-A	1,323
15	2,400	38	30,467
17	945,507	38-A	300
18	6,362,507	38-B	441,598
19	73,410	38-C	15,795
20	1,050	38-D	14,361
22	1,884	38-E	501
23	3,376	39	5,450
23-A	1,739,433	39-A	29,781
23-B	414	39-B	243,373
23-C	7,721	39-C	529,475
23-D	100	39-D	14,992
23-E	16	40	2,243,746
23-F	7,057	41	2,572
23-G	3,420,840	42	14,191
24	1,075	43	100
25	12,671	44	12,161
25-A	69,671	44-A	13,863
27	48,192	45	4,347
27-A	10,114	46	1,280
27-B	44,761	47	6,362
28	542,257		
28-A	88,265	Total	79,681,876

[1] Information as to the composition and authorized uses of these formulas will be found in the appendix to Regulations No. 3, Formulas for Completely and Specially Denatured Alcohol, Treasury Dept., Bureau of Industrial Alcohol, as amended by Treasury Decisions Nos. 4541, 4578, 4644 and 4743.

Denatured Alcohol Production by Months

Month	Completely denatured	Specially denatured	Total
July	205,980	5,915,973	6,121,953
Aug.	1,015,188	5,938,266	6,953,454
Sept.	2,144,764	6,487,318	8,632,082
Oct.	7,893,330	7,179,187	15,072,517
Nov.	5,556,990	7,059,574	12,616,564
Dec.	1,831,934	9,284,288	11,116,222
Jan.	667,706	6,138,820	6,806,526
Feb.	486,698	4,987,938	5,474,636
Mar.	260,002	6,292,297	6,552,299
April	255,623	6,843,259	7,098,882
May	921,937	6,515,668	7,437,605
June ...	878,226	7,441,693	8,319,919
Total	22,118,378	80,084,281	102,202,659

Ethyl Alcohol: Production—Withdrawals by Months—Fiscal Year '37*

Month	Production	Withdrawals Total	Tax-paid	Tax-free For denat.	Tax-free Other pur.
July	17,517,065	13,632,976	2,780,251	10,622,497	230,228
August	17,998,342	15,289,215	2,528,782	12,490,219	270,214
September	16,892,972	17,999,275	2,390,862	15,329,530	278,883
October	22,086,895	29,470,380	2,951,875	26,297,155	221,350
November	20,172,095	25,658,230	3,215,129	22,213,553	229,548
December	19,943,228	23,107,362	3,315,378	19,551,500	240,484
January	18,704,895	14,241,074	2,271,992	11,617,482	351,600
February	17,571,564	11,875,150	2,094,119	9,386,791	394,240
March	19,873,456	14,761,064	2,925,812	11,329,776	505,476
April	16,824,151	15,298,679	2,740,135	12,298,870	259,674
May	16,938,983	15,948,100	2,683,563	13,002,197	262,340
June	18,657,582	17,939,318	2,391,752	15,184,803	362,763
Total	223,181,228	215,220,823[1]	32,289,650	179,324,373[1]	3,606,800

[1] Including 194,606 proof gals. transferred to denaturing plants by alcohol plants not having bonded warehouses. * Proof Gals.

C. D. Alcohol: Withdrawals by Formulas and Months—Fiscal Year '37*

Month	Formula[1] 12	11	13	10	5-A	5	Total
July	27,681	9,973	39,959	268,022	45,812	168	391,615
August	658,170	139,194	23,152	104,030	21,779	167	946,492
September	962,962	515,577	459,236	97,194	33,461	385	2,068,815
October	3,175,381	3,324,922	1,270,115	1,062,716	11,886	2,592	8,847,612
November	1,994,141	2,640,329	888,995	424,926	4,718	1,045	5,954,154
December	940,773	929,199	70,683	48,771	540	383	1,999,349
January	201,007	376,574	52,210	8,190	810	278	639,069
February	139,500	281,852	1,223	1,842	.....	111	424,528
March	155,073	56,143	14,146	1,060	.....	....	226,422
April	210,839	50,537	559	—411[2]	.....	....	261,524
May	352,665	68,203	497,981	612	.....	....	919,461
June	572,471	227,481	13,017	1,094	.....	....	814,063
Total	9,390,663	8,619,984	3,331,276	2,018,046	119,006	5,129	23,484,104

[1] Information as to the composition and authorized uses of these formulas will be found in the appendix to Regulations No. 3, Formulas for Completely and Specially Denatured Alcohol, Treasury Dept., Bureau of Industrial Alcohol, as amended by Treasury Decisions Nos. 10, 4553, 4621, 4646 and 4648.
[2] Represents an excess of returns over withdrawals. * Wine Gals.

Ethyl Alcohol Materials Used

Kind of Material	Quantity used: Amount	Used	Alcohol produced: Proof gallons	Per cent. of total
Molasses[1]	201,792,913	Gallons	169,013,296	75.73
Ethyl sulfate	25,492,675	"	33,889,083	15.18
Grain[1]	225,623,538[2]	Pounds	18,651,946	8.36
Pineapple juice	3,598,222	Gallons	459,726	.21
Corn syrup	28,446	"	30,991	.01
Cider	34,820	"	4,025	[3]
Fermented liquor	23,157	"	2,945	[3]
Mixtures				
Molasses	838,143	"	1,129,216[4]	.51
Sulfite liquor	12,060,125	"		
Grain	7,053,649	Pounds		
Manioca meal	634,552	"		
Sweet potatoes	32,099	"		
Sorgo	5,930	"		
Dry Feed	1,161	"		
Tankage	475	"		
Total			223,181,228	100.00

[1] Additional amounts used in combination with other materials included under "Mixtures"; [2] Includes 19,180 pounds of diamalt; [3] Less than 0.01 of 1%; [4] Includes 23,184 proof gallons produced at experimental plants from materials not shown.

July 1, '36 of new formulas C.D. Nos. 11, 12, and 13 to take the place of C.D. 5-A and 10 because of the objections of industry to odors of the latter (C.I., Aug., '36, p185). In Aug., '36, because of the sharp rise in corn, alcohol producers widened the differential between grain-made and molasses-made from 25c to 40c per gal., and announced new prices: S.D. No. 1 at 23c in tanks, and 29c in drums, carlots; special solvent 24c in tanks and 30c in drums, carlots; pure, tax paid at $4.07 in tanks and $4.13 in drums in carlots and a 1c differential for barrels; the new completely denatured formulas were reduced from 40c to 34c in drums, carlots (C.I., Sept., '36, p308). Chemurgic Council disputes report of Consul Sydney B. Redecker that alcohol as a motor fuel is losing favor in Germany partly because of inefficiency (C.I., Oct., '36, p409).

Denatured Alcohol Law of '06 was 30 years old (C.I., Oct., '36, p419). Firmer prices, specially denatured advanced 3c to basis of 27c in tanks and 33c in drums special solvent unchanged at works, but the special price in Metropolitan area advanced to 24c, making uniform price of 24c for all Eastern shipments (C.I., Oct., '36, p421). Higher alcohol anti-freeze schedule fails to hold. Producers who were quoting 34c delivered in carlots change to a flat 30c at plant. In some instances, depending upon freight rate, this did not represent a net decline (C.I., Nov., '36, p535). Completely denatured advanced to 33c for drums, carlots (C.I., Dec., '36, p645). Special solvent raised from 24c to 27c in tanks (C.I., Jan., '37, p87). Bureau of Internal Revenue revokes special formulas 11, 26, 31(b), and 31(c) which have not been used for some time in line with policy to simplify formula structure (C.I., Apr., '37, p418).

Henry Webster reviews "Round the World With Power Alcohol" (C.I., June, '37, p605). Chemurgic Council discusses "Motor Fuel (Agrol) from Farm Crops" (C.I., June, '37, p634). See also July, '37, p46-48. Third quarter alcohol prices advanced 1c a gal. (C.I., July, '37, p82). Alcohol makers fight proposal to place ½c per lb. sugar processing tax upon liquid sugar used in manufacture of alcohol. Amendment to the Sugar Quota Bill was designed to help grain producing states (C.I., Aug., '37, p170). Only anhydrous tertiary butyl alcohol will be used for denaturing specially denatured—users complained of corrosive effect of the water content (A.T. No. 309) (C.I., Aug., '37, p176). Treasury Dept. issues order prohibiting sale of denatured alcohol under circumstances suggesting that it is to be used for beverage purposes. Order was designed to strengthen control over sale of denatured where there are reasons to suspect that suppliers are working with users to divert (C.I., Aug., '37, p176).

Proposed tax on sugar for alcohol production eliminated from Jones Sugar Quota and Taxing Bill. Commercial Solvents acquired industrial alcohol business of American Commercial Alcohol (C.I., Sept., '37, p291). Bureau of Internal Revenue revokes Jan. 1, '38 S.D. formulas 1-A, 15, and 44-A, another step in simplification of the S.D. formula structure (C.I., Nov., '37, "Solvent News," opposite p496). Apparent consumption of industrial ethyl alcohol from Jan. 1 to Sept. 30, '37 was 39,466,000 wine gals. This is 11.54% less than during the same period in '36 when 44,579,000 wine gals. were consumed (C.I., Dec., '37, "Solvent News," opposite p608). Alcohol schedule renewed for first quarter of '38. Shipments of anti-freeze into distribution channels large with all producers increasing sales efforts and advertising (C.I., Dec., '37, p624).

NAVAL STORES

For current prices see CHEMICAL INDUSTRIES News & Markets Department: for current statistics see CHEMICAL INDUSTRIES Data Section each month.

Second Semi-Annual Report

Second semi-annual naval stores report on production, distribution, consumption and stocks of turpentine and rosin in U. S. jointly by Bureau of Chemistry and Soils, Dept. Agriculture, and Bureau of Foreign and Domestic Commerce. Dept. Commerce: F. P. Veitch and C. F. Spen for Bureau of Chemistry and Soils, and J. E. Lockwood, Savannah, again collaborated.

Production of gum and wood turpentine in the U. S. first half of 1937-38 season totalled 444,879 bbls. of 50 gals. each, and production of gum and wood rosin totalled 1,543,940 bbls. of 500 lbs. gross each, compared with 408,526 bbls. of turpentine and 1,427,937 bbls. of gum rosin in first half of 1936-37. Stocks of turpentine increased 56,835 bbls., of rosin, 249,671 bbls. during period.

Normally, approximately 72% of total annual gum crop is produced April-Sept. Wood naval stores production, on the other hand, is not seasonal, based largely on estimated consumer demand. Figures for wood naval stores production for April-Sept. period probably represent 50% of probable production this class for 1937-38 season.

No worthwhile comparison can be made between total industrial consumption or the consumption by groups for April-Sept. 1936, and for April-Sept. 1937 periods, because so small a percentage of consumption by some industrial groups is covered by the returns for April-Sept. 1936, that the total reported consumption of that period includes consumption of those who used but 67% of total industrial consumption of turpentine and but 82% of total industrial consumption of rosin reported for the calendar year '35. However, a compilation of April-Sept. consumption 1937 and 1936 by *all* reporting firms in each group is given in Table 7 and also a compilation of a consumption by those firms in each group from whom consumption reports were received for both April-Sept. periods.

Two Years' Comparison

A comparison of figures for the two years shows approximately 34% increase in turpentine and approximately 5% decrease in rosin consumption compared with April-Sept. 1936 consumption of those who reported in both April-Sept. periods.

Like most commodities rosin and turpentine prices declined severely in latter part of April-Sept. 1937. A comparison is given directly opposite of the Savannah market and the net losses sustained.

Table 1. Supply, Distribution and Carryover of Turpentine and Rosin.
(By naval stores seasons April 1 to following March 31)

	TURPENTINE (Bbls.—50 gals.) 1937-38 Apr.-Sept. 6 mos.	1936-37 Apr.-Sept. 6 mos.	1936-37 Apr.-Mch. 12 mos.	ROSIN (Bbls.—500 lbs. gross) 1937-38 Apr.-Sept. 6 mos.	1936-37 Apr.-Sept. 6 mos.	1936-37 Apr.-Mch. 12 mos.
SUPPLY AND DISTRIBUTION						
Carryover Apr. 1[1]	223,364	230,136	230,136	663,251	765,807	765,807
Production[2]	444,879	408,526	634,520	1,543,940	1,427,937	2,331,962
Imports[3]	5,310	9,648	15,929	332	2,041	2,418
Available supply	673,553	648,310	880,585	2,207,523	2,195,785	3,100,187
Less carryover Sept. 30	280,199	......[6]	223,364[7]	912,922	......[6]	663,251[7]
Apparent total consumption	393,354	......[6]	657,221	1,294,601	......[6]	2,436,936
Less exports[4]	156,639	160,526	271,353	610,752	624,549	1,099,438
Apparent U. S. consumption	236,715	......[6]	385,868	683,849	......[6]	1,337,498
PRODUCTION AND IMPORTS						
Gum	361,986	345,700	482,787	1,122,612[5]	1,095,545[5]	1,607,934[5]
Wood	82,893	62,826	151,733	421,328	332,392	724,028
Imports	5,310	9,648	15,929	332	2,041	2,418
Total	450,189	418,174	650,449	1,544,272	1,429,978	2,334,380
CARRYOVER (STOCKS)						
Carryover April 1	223,364	230,136	230,136	663,251	765,807	765,807
Carryover Sept. 30	280,199	......[6]	223,364[7]	912,922	......[6]	663,251[7]
Increase	56,835	......	......	249,671	......	......
Decrease	......	......	6,772	......	......	102,556

(1) Table 7 of this and 1936-37 Annual Report; (2) Table 4; (3) Table 8 of this and 1936-37 Annual Report; (4) Table 10-15 of this and 1936-37 Annual Report; (5) Includes reclaimed rosin; (6) Omitted due to the fact that reports of consumption and consumers' stocks were received from only consumers reporting 67% of turpentine and 82% of rosin reported consumed in 1935-36; (7) Carryover for March 31.

Table 2. Details of Production
(By naval stores seasons April 1 to following March 31)

U. S. PRODUCTION

	TURPENTINE (Bbls.—50 gals.) 1937-38 Apr.-Sept. 6 mos.	1936-37 Apr.-Sept. 6 mos.	1936-37 Apr.-Mch. 12 mos.	ROSIN (Bbls.—500 lbs. gross) 1937-38 Apr.-Sept. 6 mos.	1936-37 Apr.-Sept. 6 mos.	1936-37 Apr.-Mch. 12 mos.
Gum[1]	361,986	345,700	482,787	1,114,069	1,076,367	1,565,240
Reclaimed (Gum)	......	......	......	8,543	19,178	42,694
Steam Dist. Wood	70,086	53,736	122,388	421,328	332,392	724,028
Sulfate Wood	9,386	5,635	22,635	......	......	......
Dest. Dist. Wood	3,421	3,455	6,710	......	......	......
Total	444,879	408,526	634,520	1,543,940	1,427,937	2,331,962
PRODUCTION BY STATES						
States						
North Carolina	555	......[2]	682	1,886	......[2]	2,260
South Carolina	9,606	......[2]	14,570	31,192	......[2]	45,040
Georgia	213,713	......[2]	276,681	653,743	......[2]	894,898
Florida	86,922	......[2]	124,585	265,811	......[2]	409,705
Alabama	37,982	......[2]	51,077	118,339	......[2]	164,705
Mississippi	10,167	......[2]	11,080	33,794	......[2]	36,103
Louisiana	1,439	......[2]	2,245	4,511	......[2]	6,581
Texas	1,602	......[2]	1,867	4,793	......[2]	5,948
Total	361,986	......[2]	482,787	1,114,069	......[2]	1,565,240

(1) Gum naval stores production includes 7,359 bbls. of turpentine and 23,542 bbls. of rosin estimated for those from whom reports were not received, based on information from factors and others, are included to permit a better comparison with previous years; (2) Information not available.

	Apr. 1, '37	Sept. 30, '37	Net Gain or Loss
B	$7.50	$7.50	......
D	7.75	7.50	—$.25
E	8.05	7.50	— .55
F	8.75	7.85	— .90
G	8.75	7.85	— .90
H	8.75	7.85	— .90
I	8.75	7.85	— .90
K	8.75	7.85	— .90
M	8.75	7.85	— .90
N	8.80	7.90	— .90
WG	8.80	8.15	— .65
WW	9.75	8.60	—1.10
X	9.75	8.60	—1.10
Turpentine	.42	.30	— .12

Table 3. Gum Turpentine Production
(Percentage by States)

	1937-38 Apr.-Sept.	1936-37 Apr.-Mch.
North Carolina	.15	.14
South Carolina	2.65	3.01
Georgia	59.04	57.29
Florida	24.02	25.81
Alabama	10.50	10.58
Mississippi	2.80	2.30
Louisiana	.40	.48
Texas	.44	.39
Total	100.00	100.00

Naval Stores

Season Apr. 1, 1937-Sept. 30, 1937—p. 2

Table 4. U. S. Exports Turpentine

(By naval stores seasons Apr. 1 to following Mar. 31)

TOTAL EXPORTS TURPENTINE

Destination	1937-38 Apr.-Sept. 6 mos. (Bbls.—50 gals.)	1936-37 Apr.-Sept. 6 mos.	1936-37 Apr.-Mch. 12 mos.
United Kingdom	70,576	84,931	134,831
Germany, N. Europe	43,987	35,424	59,638
Italy, S. Europe	5,161	8,071	15,717
Argentine	2,784	2,268	3,743
Brazil	1,567	1,279	2,408
Other So. America	2,443	1,923	4,217
Japan	752	715	1,125
Australia, New Zealand	9,226	9,125	17,814
Netherlands East Indies	117	10	22
Canada	15,015	13,343	23,625
All other Exports	5,011	3,437	8,213
Total	156,639	160,526	271,353

Table 5. U. S. Exports of Rosin

(By naval stores seasons Apr. 1 to following Mar. 31)

TOTAL EXPORTS ROSIN[1]

Destination	1937-38 Apr.-Sept. 6 mos. (Bbls.—500 lbs. gross)	1936-37 Apr.-Sept. 6 mos.	1936-37 Apr.-Mch. 12 mos.
United Kingdom	157,054	150,685	243,392
Germany, N. Europe	160,762	193,641	331,268
Italy, S. Europe	13,766	33,392	49,555
Argentine	45,290	47,751	68,101
Brazil	44,722	24,892	43,329
Other So. America	21,607	16,650	30,887
Japan	67,334	62,883	124,742
Australia, New Zealand	14,334	10,886	29,260
Netherlands East Indies	16,348	18,120	53,556
Canada	46,745	31,016	59,135
All other Exports	22,790	34,632	66,213
Total	610,752	624,549	1,099,438

Table 8. Average Price Gum Turpentine: Gum Rosin

	Gum Turpentine* ¢ per gal.	Gum Rosin* $ per bbl.
1921-22	62.62	7.50
1922-23	119.82	9.29
1923-24	95.22	8.34
1924-25	81.30	10.02
1925-26	96.66	19.84
1926-27	82.62	21.79
1927-28	51.38	14.91
1928-29	50.54	14.80
1929-30	48.28	13.46
1930-31	39.34	8.96
1931-32	40.10	6.95
1932-33	38.82	5.05
1933-34	42.72	6.93
1934-35	45.64	8.13
1935-36	43.56	8.11
1936-37	37.48	11.47

* Season average price was obtained by multiplying each monthly price by the combined reported receipts during that month at Savannah, Jacksonville and Pensacola and dividing the total of these figures for the season by the total receipts for that season, thereby giving the months of heavy receipts and of low receipts their proper relative values.

For current prices see CHEMICAL INDUSTRIES News & Markets Department: for current statistics see CHEMICAL INDUSTRIES Data Section each month.

Table 6. Details of Carryover (Stocks)

	TURPENTINE (Bbls.—50 gals.) 1937 Sept. 30 Gum	1937 Sept. 30 Wood	1936 Sept. 30 Gum and wood	1937 Mar. 31 Gum and wood	ROSIN (Bbls.—500 lbs. gross) 1937 Sept. 30 Gum	1937 Sept. 30 Wood	1936 Sept. 30 Gum and wood	1937 Mar. 31 Gum and wood
Gum stills[1]	25,245	......	19,708	11,272	160,545	......	100,520	50,847
Savannah[2]	36,019	......	35,429	23,728	69,709	......	87,158	43,633
Jacksonville[2]	30,663	......	46,722	37,692	47,503	......	72,760	47,299
Pensacola[2]	24,944	......	30,815	14,980	26,857	......	30,004	18,001
Other Southern Ports	41,750	......	36,169	32,297	57,520	......	103,682	72,436
Interior yards	31,449	......	25,464	13,918	22,193	......	46,425	33,364
Total	164,825	......	174,599	122,615	223,782	......	340,029	214,733
Wood plants:								
Steam dist.[3]	......	16,218	9,758	21,943	......	100,249	41,666	47,059
Sulfate	......	3,755	1,165	3,499	......	......	......	......
Destructive dist.	......	452	884	643	......	......	......	......
Total	......	20,425	11,807	26,085	......	100,249	41,666	47,059
Distributing points:								
Eastern	7,492	3,561	11,708	9,760	9,487	6,011	17,659	11,341
Central	22,267	8,015	21,861	19,201	7,619	2,528	8,919	8,429
Western	6,116	1,900	3,832	3,642	506	517	1,167	1,179
Total[4]	35,875	13,476	37,401	32,603	17,612	9,056	27,745	20,949
Industrial plants[5]	12,493	7,860	18,426	30,789	341,258	60,420	295,203	239,663
SUMMARY CARRYOVER (STOCKS)								
Gum stills	25,245	......	19,708	11,272	160,545	......	100,520	50,847
Sou. ports and int. yards	164,825	......	174,599	122,615	223,782	......	340,029	214,733
Wood plants	......	20,425	11,807	26,085	......	100,249	41,666	47,059
No. dist. points	35,875	13,476	37,401	32,603	17,612	9,056	27,745	20,949
Industrial plants	12,493	7,860	18,426	30,789	341,258	60,420	295,203	329,663
Total in U. S.	238,438	41,761	261,941	223,364	743,197	169,725	805,163	663,251
At and afloat to London[6]	25,651		21,698	21,300				
Total U. S. and London	305,850		283,639	244,664				

(1) Compiled from reports by producers and factors; (2) Official Board of Trade and Chamber of Commerce reports; (3) Does not include by-products from making pale grades from FF wood rosin; (4) Compiled from reports of individual distributors; (5) Compiled from reports of individual consumers; (6) Gum and wood.

Table 7. Comparison Reported U. S. Consumption Turpentine and Rosin

April-Sept. 1937 with April-Sept. 1936

	TURPENTINE (Bbls.—50 gals.) Reported Totals (Apr.-Sept.) 1937	Reported Totals 1936	Comparable Reported Totals (Apr.-Sept.) 1937	Comparable Reported Totals 1936	ROSIN (Bbls.—500 lbs. gross) Reported Totals (Apr.-Sept.) 1937	Reported Totals 1936	Comparable Reported Totals (Apr.-Sept.) 1937	Comparable Reported Totals 1936
Abattoirs	......	......	......	......	1,174	449	519	447
Adhesives and plastics	231	132	58	132	9,318	7,652	5,488	5,688
Asphaltic products	2	......	2	......	862	697	862	697
Automobiles and wagons	318	153	200	153	361	622	200	622
Chemicals and pharmaceuticals	18,646	4,540	13,345	4,540	68,416	35,325	39,959	34,289
Ester gum and synthetic resins	......	......	......	......	58,258	40,321	47,476	40,306
Foundries and foundry supplies	500	88	67	67	11,031	5,650	6,795	5,650
Furniture	299	150	140	150	51	105	......	......
Insecticides and disinfectants	275	230	254	181	2,626	2,212	2,294	2,212
Linoleum and floor covering	43	35	43	35	17,672	12,137	15,348	12,137
Matches	......	......	......	......	1,094	1,238	805	1,238
Oils and greases	110	24	14	24	12,570	12,907	10,208	12,907
Paint, varnish and lacquer	34,837	22,532	20,742	20,851	83,835	30,428	31,272	28,845
Paper and paper size	7	......	......	......	202,702	180,060	178,699	180,060
Printing ink	94	120	92	120	5,196	7,030	5,124	7,030
Railroads and shipyards	3,456	1,765	2,413	1,745	499	140	79	75
Rubber	94	90	94	90	1,587	1,133	1,520	1,133
Shoe polish and shoe materials	6,439	4,177	6,024	4,177	3,728	4,609	3,208	4,609
Soap	3	......	......	......	115,864	150,453	112,568	150,453
Other industries	924	392	316	392	3,088	1,461	1,757	1,336
Total	66,278	34,428	43,804	32,657	599,932	494,629	464,181	489,734

NOTE: "Reported Totals" includes some consumers not reporting in both years; "Comparable Reported Totals" includes only consumers who reported in both years; "Reported Totals" for 1937 are not comparable with those for 1936; "Comparable Reported Totals" for 1937 and for 1936 are comparable.

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Jan. '38

CHEMICAL INDUSTRIES

NO. 1
Part 2

Statistical and Technical Data Section

World Figures on N.

Production

Annual nitrogen statistics of the British Sulphate of Ammonia Federation in Table 1 are offered as fair estimates, but strict accuracy is not claimed. Data for 1934-35 and 1935-36 have been slightly revised.

During the fertilizer year 1937 estimated increase was 201,000 metric tons of nitrogen, 8.4%, in actual production of the forms of nitrogen enumerated in Table 1. Production in Chile increased 14,000 tons, or 7%, and synthetic output in other. countries increased 187,000 tons, or 9%. As indicated by asterisks, 1936-37 was a record year for output of most forms of N. As in the previous year, most marked increases in manufactured N. output have been in Germany, Japan, and U. S. Synthetic nitrogen plants have average operation of about 50% capacity during the year. World production capacity for synthetic nitrogen, including cyanamid, is estimated at 3,900,000 tons N.

Consumption

Total N. consumption increased 258,099 tons, or 10.7%, following increase of 16.7% last fertilizer year. Increase in fertilizer N. consumption was 261,000 metric tons, or 12.5% compared with 15.0% previous year. Each main class of fertilizer material showed an increase; ammonium sulfate (including ammonia for mixed fertilizers) increased by 130,764 tons N., or 12.9% over the 1935-36 figure.

Increased consumption ammonium sulfate in Asia is noteworthy—almost 100,000 tons N., or three-quarters of total world increase: about two-thirds of the Asiatic increment in Japanese Empire, one-fifth in China, and remainder scattered.

In Europe catastrophic fall in consumption in Spain, due to Civil War, was more than counterbalanced by large increases in other countries, particularly Germany, where prices were reduced by 30% by Government decree.

Order of importance in the production and consumption of N. forms for agricul-

Table 1. World Production—Consumption Pure Nitrogen for Fertilizer Years.

(In thousands of metric tons)

	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37
Production:										
Sulfate of Ammonia:										
By-product	368	376	425*	360	302	258	307	321	376	407
Synthetic	367	485	442	349	522	560	535	533	630	654*
	735	861	867	709	824	818	842	854	1,006	1,061*
Cyanamid	198	192	264	201	134	168	195	232	269	285*
Nitrate of Lime ...	105	136	131	110	79	118	107	153	156	159*
Other forms of Nitrogen:†										
Synthetic	242	383	427	393	348	462	516	607	724	843*
By-product	54*	51	51	31	30	40	48	45	46	40
Chile Nitrate	390	490*	464	250	170	71	84	179	192	206
Total production..	1,724	2,113	2,204	1,694	1,585	1,677	1,792	2,070	2,393	2,594*
Percentage Increase or Decrease	+30.4%	+22.6%	+4.3%	—23.1%	—6.4%	+5.8%	+6.9%	+15.5%	+15.6%	+8.4%
Consumption:										
Manufactured Nitrogen	1,249	1,453	1,587	1,377	1,417	1,620	1,714	1,877	2,201	2,433*
Chile Nitrate	393	419*	364	244	138	127	164	195	216	242
Total consumption	1,642	1,872	1,951	1,621	1,555	1,747	1,878	2,072	2,417	2,675*
Percentage Increase or Decrease	+20.2%	+14.0%	+4.2%	—16.9%	—4.1%	+12.3%	+7.5%	+10.3%	+16.7%	+10.7%
Agricultural consumption about	1,460	1,670	1,750	1,455	1,412	1,586	1,673	1,812	2,084	2,344*
Percentage Increase or Decrease	+22.7%	+14.4%	+4.8%	—16.9%	—3.0%	+12.3%	+5.5%	+8.3%	+15.0%	+12.5%

* Highest figure ever reached; † Including N. products used for industrial purposes (except Chile nitrate) and ammonia in mixed fertilizers.

NOTE.—Fertilizers are included in these tables under the final form as sold, so that, for example, cyanamid if converted into sulfate of ammonia is included under synthetic sulfate of ammonia, or, if into ammophos, is included under other synthetic nitrogen.

Table 2. Balance Exports Ammonium Sulfate

(In metric tons of nitrogen calculated at 20.6 per cent.)

	Balance of Exports from					
Calendar Year	Great Britain and Ireland	United States *a*	Germany	Other European Countries *b*	British Empire Countries *c*	Total
1920	22,832	12,050	5,346	197	6,759	47,184
1921	26,163	20,498	2,385*	473	5,323	54,842
1922	29,862	29,804	2,443	1,532	3,930	67,571
1923	51,588	31,423	24,489	4,810	4,835	117,145
1924	54,764	23,518	21,323†	2,904	5,290	107,799
1925	51,736	20,800	100,903†	2,201	4,728	180,368
1926	30,252	34,680	138,057†	3,233	3,647	209,869
1927	52,405	25,438	137,770†	1,918	4,371	221,902
1928	78,824	10,663	172,426†	5,591	2,292	269,796
1929	120,381	26,310	149,680†	13,666	4,255*d*	314,292
1930	111,757	10,021	86,298†	36,814	1,605*d*	246,495
1931	78,281	.....	125,878†	51,010	.....	255,169
1932	81,062	.....	77,238	98,671	5,136*d*	262,107
1933	61,457	.....	91,872	72,381	11,995*d*	237,705
1934	56,274	.....	73,982	74,681	8,720*d*	213,657
1935	47,443	.....	90,059	95,513	7,620*d*	240,635
1936	38,665	.....	83,933	85,067	14,970*d*	222,635

* May to December only; † Including reparations deliveries; *a* Not including exports from U. S. but including imports from other countries to the non-contiguous territories of Alaska, Hawaii and Porto Rico; *b* Poland, Belgium, Holland, Czechoslovakia, Italy, Sweden, Norway, Austria, Hungary, Roumania and Russia; *c* Canada, Australia, India, S. Africa and New Zealand; *d* All from Canada.

Table 3. British Ammonium Sulfate Exports

(Tons of 2,240 lbs.)

Total exports of ammonium sulfate from Great Britain and Ireland show an increase of 44,414 tons or about 22% on last year's figures. The following figures show the shipments to the principal markets:

	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37
Spain, Portugal, Canaries	104,396	221,380	166,519	184,167	137,570	114,585	93,349	33,254	40,008
Japan	146,087	158,971	52,062	52,159	3,000	64,315	7,025	201	.....
China and Hong Kong	93,332	109,888	72,206	44,314	59,817	13,441	6,950	12,221	36,726
West Indies, British Guiana and Mauritius	17,919	16,263	16,101	22,859	30,952	22,534	25,361	34,626	39,557
India and Ceylon	30,808	37,312	21,150	35,421	48,771	51,274	58,172	58,621	57,502
Australia and New Zealand	5,220	20,083	15,151	9,498	25,869	13,285	18,781	30,634	27,884
South and East Africa	1,904	2,143	1,769	3,220	7,440	8,586	9,927	9,556	9,900
Malaya	1,683	2,625	1,996	651	360	2,260	4,625	8,624	20,302

Nitrogen

World Trade Fertilizer Year 1936-37—p. 2

tural use remains roughly as in recent year, viz: ammonium sulfate, 47-49% of all fertilizer N.; cyanamid 11-13%; Chile nitrate 9-10%; lime ammonium nitrate ("Nitrochalk" forms) 8-9%; calcium nitrate 7-8%; sodium nitrate (for fertilizer) 3-4%; and other synthetic nitrogenous fertilizers 9-12%. The international agreements continued to operate satisfactorily.

Table 3 shows the excess of exports over imports of ammonium sulfate during the last 17 calendar years, expressed in metric tons of nitrogen, for all countries having a surplus in any year.

U. S. Developments

Among technical and market developments of 1936-37 season were: so-called saturation method for ammonium sulfate production said to give coarser grain structure tending to prevent caking (C. I. Jan., '36, p. 52): General stiffening of nitrogen price structure in February '36 when sulfate was advanced $1. per ton to $23. and nitrate of soda $1. per ton to a basis of $24.50. Large exports of sulfate (C. I., March, '36, p. 309). Elimination of the calcium carbide step in manufacture cyanamid reported by Russian chemists (C. I., May, '36, p. 499). Scarcity of spot sulfate stocks (caused by the floods in steel areas previous month) and price advanced to $24. (C. I., May, '36, p. 529). Improvement in the production of non-caking ammonium sulfate described Eng. Pat. 445,120 of I. G. (C. I., July, '36, p. 51). Sulfate advanced another $1. to $25. per ton but nitrate unchanged (C. I., July, '36, p. 89). Sulfate producers announce 50c advance for Oct.-Nov. delivery and additional 50c for Dec. to June period. Cyanamid, unchanged for Gulf and interior points, is raised at Atlantic ports to $1.03 per unit ammonia (C. I., Aug., '36, p. 199).

"Synthetic" Controls Price

For the first time synthetic producer sodium nitrate takes initiative in price and announces a $1. per ton advance to a basis of $25.50 (C. I., September, '36, p. 312). Japan invades I. C. I. Indian sulfate market and British producer refuses to meet $27. per ton figure, believing Japs have oversold their position. Latter said to be making inquiries in N. Y. and London (C. I., Oct., '36, p. 425). Sulfate again advanced 50c for Dec.-June deliveries to $26. per ton (C. I., Dec., '36, p. 645). Cyanamid prices advanced in line with sulfate and nitrate and $1.05 established for Atlantic ports and $1.10 for Gulf ports and interior points (C. I., Jan., '37, p. 85). Sulfate advanced $1. per ton to $27, and cyanamid to $1.12½ (C. I., Feb., '37, p. 199). Cyanamid raised 3rd time to basis $1.15 (C. I., April, '37, p. 419).

Table 4. World Consumption of Pure Nitrogen

(In metric tons)

Continent	Fertilizer Year	Ammonium Sulfate and Ammonia for Mixed Fertilizers	Chile Nitrate	Calcium Cyanamid	Other Synthetic Nitrogen Fertilizers	Nitrogen Products for Industrial Purposes (excl. Chile nitrate)	Total
Europe (incl. U.S.S.R.)	1927-28	409,474	176,225	163,414	219,077	61,446	1,029,636
	1928-29	416,860	201,010	173,370	274,790	85,630	1,151,660
	1929-30	429,101	187,357	168,465	300,801	84,852	1,170,576
	1930-31	369,459	141,000	138,396	278,191	67,426	994,472
	1931-32	441,363	90,544	121,544	290,147	71,043	1,014,641
	1932-33	433,011	69,525	134,131	347,080	76,852	1,060,599
	1933-34	407,834	80,460	151,851	392,149	89,210	1,121,504
	1934-35	453,687	83,281	171,604	398,117	105,769	1,212,458
	1935-36	517,243	89,574	202,627	468,915	145,186	1,423,545
	1936-37	498,564	86,378	199,751	553,024	155,076	1,492,793
Africa	1927-28	8,653	33,255	566	6,597	100	49,171
	1928-29	9,330	32,030	330	9,070	270	51,030
	1929-30	10,460	36,176	680	13,057	275	60,648
	1930-31	8,727	30,400	654	13,085	505	53,371
	1931-32	10,947	23,407	120	22,506	4,188	61,168
	1932-33	16,085	9,170	194	28,997	6,318	60,764
	1933-34	13,532	21,398	164	25,292	6,743	67,129
	1934-35	15,113	24,369	218	32,834	8,234	80,768
	1935-36	14,634	28,283	167	48,574	12,286	103,944
	1936-37	15,620	34,332	195	51,994	12,766	114,907
Asia	1927-28	161,723	13,090	19,708	2,374	4,600	201,495
	1928-29	196,140	16,860	19,380	7,110	5,680	245,170
	1929-30	217,381	9,504	22,770	15,480	5,074	270,209
	1930-31	200,219	5,900	28,467	8,652	6,002	249,240
	1931-32	211,639	3,258	12,450	11,698	10,164	249,209
	1932-33	269,069	3,159	31,551	17,370	10,024	331,173
	1933-34	254,941	3,484	29,944	16,284	19,614	324,267
	1934-35	292,002	5,351	35,434	18,134	21,724	372,645
	1935-36	320,028	5,815	41,101	32,556	35,257	434,757
	1936-37	418,733	6,319	48,546	23,424	34,883	531,905
Oceania (incl. Hawaii)	1927-28	7,390	9,340	......	1,001	400	18,131
	1928-29	9,730	10,400	......	950	400	21,480
	1929-30	14,934	13,222	20	2,108	1,100	31,384
	1930-31	15,149	6,000	6	3,345	934	25,434
	1931-32	14,719	4,852	......	4,291	850	24,712
	1932-33	17,815	595	......	3,922	1,244	23,576
	1933-34	23,607	2,469	......	3,637	1,344	31,057
	1934-35	16,646	2,081	......	2,251	1,644	22,622
	1935-36	21,342	2,505	......	2,557	2,208	28,612
	1936-37	22,179	4,272	......	2,811	2,289	31,551
America	1927-28	84,992	160,812	18,680	24,324	55,150	343,958
	1928-29	95,600	159,150	24,400	58,290	65,300	402,740
	1929-30	139,880	117,634	26,000	68,799	65,667	417,980
	1930-31	129,400	61,000	13,765	39,978	54,645	298,788
	1931-32	113,458	16,147	10,554	14,480	50,965	205,604
	1932-33	132,656	44,793	10,417	21,887	61,082	270,835
	1933-34	132,064	55,739	14,121	50,973	80,736	333,633
	1934-35	124,522	80,023	17,002	48,332	113,144	383,023
	1935-36	144,622	89,832	17,831	43,439	130,179	425,903
	1936-37	193,537	110,688	26,000	55,967	117,512	503,704
World	1927-28	672,232	392,722	202,368	253,373	121,696	1,642,391
	1928-29	727,660	419,450	217,480	350,210	157,280	1,872,080
	1929-30	811,756	363,893	217,935	400,245	156,968	1,950,797
	1930-31	722,954	244,300	181,288	343,251	129,512	1,621,305
	1931-32	792,126	138,208	144,668	343,122	137,210	1,555,334
	1932-33	868,636	127,242	176,293	419,256	155,520	1,746,947
	1933-34	831,978	163,550	196,080	488,335	197,647	1,877,590
	1934-35	901,970	195,105	224,258	499,668	250,515	2,071,516
	1935-36	1,017,869	216,009	261,726	596,041	325,116	2,416,761
	1936-37	1,148,633	241,989	274,492	687,220	322,526	2,674,860

1937-38 Price Schedules Designed to Spread Deliveries

New prices for the next fertilizer year announced and sulfate producers follow potash suppliers in effort to "spread" buying offer 13-month season and 3 positions: a; for spot or non-contract buyers, b; for contracts for shipment from 1-5 months with a monthly tonnage specified quotations are $27.50 for June-Oct. shipment: $29. for Nov.-Dec. shipment; and $29.50 for Jan.-June, and c; for contracts covering equal monthly shipments during any 6-10 months the prices are respectively $1. lower in each bracket and on 11-13 month basis prices are $2. lower. Contract price on urea-ammonia liquor is $1. per NH_3 unit, a 4c reduction from spot price, but 4c higher than current season's contract. (C. I., June, '37, p. 640).

U. S. Chemical Patents

Off. Gaz.—Vols. 482 to 485, Nos. 3, 4, 5, 1—p. 1

Apparatus

Apparatus for generating gaseous fuel from solid carbonaceous material. No. 2,099,150. Arthur P. van Heeden to Universal Oil Products Co., both of Chicago, Ill.
Apparatus for manufacture mercury sulfate. No. 2,099,290. Ronald J. Baird, Passaic, N.J., to A. O. Smith Corp., Milwaukee, Wis.
Furnace for treating phosphate materials. No. 2,100,843. Samuel Fischer, N. Y. City, to American Agricultural Chemical Co., Newark, N. J.

Cellulose

Method and apparatus for drying a highly shrinkable, non-fibrous, transparent, cellulosic web adapted to be used as wrapping tissue. No. 2,099,160. Wm. Hale Charch, Buffalo, N. Y., to du Pont, Wilmington, Del.
Process and apparatus for drying highly shrinkable, non-fibrous, transparent, cellulosic webs. No. 2,099,162. Walter C. Eberlin, Kenmore, N. Y., to du Pont, Wilmington, Del.
Colored cellulose ester wrapping material which is moistureproof and capable of permanently retaining water-soluble adhesives, comprising a cellulose acetate base coated on one surface with a water-insoluble dicarboxylic acid ester of cellulose. No. 2,099,341. Wm. O. Kenyon and Russel H. Van Dyke, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.
Recovery cellulose esters from film scrap. No. 2,099,347. Marvin J. Reid to Eastman Kodak Co., both of Rochester, N. Y.
Recovery an organic acid ester of cellulose from photographic film scrap. No. 2,099,348. Marvin J. Reid to Eastman Kodak Co., both of Rochester, N. Y.
Delustered cellulose articles prepared from cellulosic solutions. No. 2,099,441. Winfield Walter Heckert, Ardentown, Del., to du Pont, Wilmington, Del.
Preparation cellulosic structure containing a finely divided delustering agent. No. 2,099,455. Daniel E. Strain to du Pont, both of Wilmington, Del.
Manufacture cellulose acetate. No. 2,099,753. Robt. Pierce Roberts and Edgar Bertie Johnson, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.
Compositions containing derivatives of cellulose and an aromatic acid ester of a formal of a dihydric alcohol. No. 2,099,758. Geo. W. Seymour, Cumberland, Md., to Celanese Corp. of America, corp. of Del.
Manufacture cellulose compounds and shaped articles therefrom. No. 2,100,010. Leon Lilienfeld, Vienna, Austria.
Preparation low substituted methyl cellulose, using sodium hydroxide solution to which has been added sodium methyl sulfate. No. 2,101,262. Robt. W. Maxwell to du Pont, both of Wilmington, Del.
Continuous preparation cellulose derivatives. No. 2,101,263. Robt. W. Maxwell to du Pont, both of Wilmington, Del.
Method and apparatus for drying cellulose and like material in a continuous web. No. 2,101,301. Sven Wellmar, Stockholm, Sweden.
Production mixed cellulose esters containing at least two dissimilar acyl radicals. No. 2,101,413. Otto Sindl, Paris, France, and Georg Frank, Moedling, near Vienna, Austria, to Afag Finanzierungs A. G., Schaffhausen, Switzerland.

Chemical Specialties

Finger print powder comprising hydroquinone, and a water soluble gum. No. 2,099,028. Justin J. McCarthy, Boston, Mass.
Manufacture aluminous cement concrete; mixing with aluminous cement, waste sulfite liquor residue. No. 2,099,176. Edward W. Scripture, Jr., Shaker Heights, O., to Master Builders Co., Cleveland, O.
Packing composition consisting of an intimate mixture of asbestos, graphite, powdered aluminum, lubricating oil, and dispersed compounded polychloroprene. No. 2,099,241. Hugh T. Stewart to Garlock Packing Co., both of Palmyra, N. Y.
Packing composition composed of vulcanized binding material, lubricating oil, asbestos fibres, powdered aluminum, and powdered graphite. No. 2,099,242. Hugh T. Stewart to Garlock Packing Co., both of Palmyra, N. Y.
Production a stable, aqueous clay emulsion of bitumen of the oil-in-water type. No. 2,099,351. Preston R. Smith, Rahway, N. J., to Barber Co., Phila., Pa.
Preparation aqueous clay emulsion of bitumen of the oil-in-water type, containing a copper salt of a monobasic acid. No. 2,099,352. Preston R. Smith, Rahway, N. J., to Barber Co., Phila., Pa.
Preparation aqueous clay emulsion of bitumen of the oil-in-water type, containing a lead salt. No. 2,099,353. Preston R. Smith, Rahway, N. J., to Barber Co., Phila., Pa.
Preparation brazing flux consisting of mixture of an acid fluoride of an alkali metal and boric acid with or without water. No. 2,099,582. Irving R. Valentine, Erie, Pa., to General Electric Co., corp. of New York.
Fungicidal composition containing a powdered dried zeolitic neutral aluminosilicate gel, containing copper oxide incorporated in the gel structure in a non-exchangeable form fungicidally available. No. 2,099,623. Ray Riley, Long Island City, N. Y., and Wm. McAfee Bruce, Mt. Holly, N. J., to Permutit Co., New York City.
Composition for protecting materials against parasitic attack, comprising a dispersion of a parasiticide in an aqueous solution of an acetate of deacetylated chitin. No. 2,098,942. Merlin Martin Brubaker, Lindemere, Del., to du Pont, Wilmington, Del.
Production water-soluble condensation products suitable as tanning agents; treating cellulose sulfite waste liquor with a phenolic body of the benzene series, an organic sulfonic acid, and a low molecular aliphatic compound. No. 2,099,717. Richard Alles, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.
Finishing textiles by treatment in an aqueous medium with a starch paste, in last step adding an acid-reacting substance No. 2,099,765. Horst Dietrich Freiherr von der Horst, Leuna, and Ferdinand Muenz and Adolf Vogt, Frankfort-am-Main, Germany, to I. G., Frankfort-am-Main, Germany.
Textile printing paste containing calcium thiocyanate, water, viscose waste, and formaldehyde. No. 2,099,782. Ernst Weiss, Wattwil, Switzerland, to Heberlein Patent Corp., New York City.
Drilling fluid, comprising an oil, a weighting material, and a water-insoluble soap. No. 2,099,825. Ferdinand W. Rolshausen and Sam L. Bishkin, Houston, Tex., to Standard Oil Development Co., corp. of Del.
Insecticide containing as its essential active ingredient a dialkylacridan. No. 2,099,826. Paul S. Schaffer and Herbert L. J. Haller, Washington, D. C., to free use of the people of the U. S.
Paper sizing composition comprising a blown wax softened with an oil. No. 2,099,880. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.
Manufacture clear soap with sulfite cellulose spent lye. No. 2,100,047. Karl Braun, Berlin-Frohnau, and Hermann Plauson, Berlin, Germany.
Manufacture a strongly swellable substance from wool grease, using an alcoholic solution of caustic potash containing petroleum-ether. No. 2,100,067. Henryk Cohn and Conrad Siebert, Berlin, Germany.
Decalcomania, comprising a paper base having a water-soluble adhesive thereon. No. 2,100,140. Ferdinand W. Humphner, Oak Park, Ill., to Mid-States Gummed Paper Co., corp. of Del.
Manufacture soap from marine oils. No. 2,100,146. Sigval Schmidt-Nielsen, Trondhjem, and Arne Flood, Larvik, Norway.
Finish for fabrics of organic derivatives of cellulose. No. 2,100,408. Herbert Platt, Cumberland, Md., to Celanese Corp. of America, corp. of Del.
Lacquer solvent and thinner, having high solvent power for cellulose ethers, esters and ether-esters. No. 2,100,425. Franklin A. Bent and Simon N. Wik, Berkeley, and Wm. Ponig, San Francisco, to Shell Development Co., San Francisco, Calif.
Germicidal and fungicidal, saponifiable composition, comprising synthetic fatty acids derived from an oxidized petroleum hydrocarbon and an alkali metal hydroxide. No. 2,100,469. Cornelia Burwell, Ann Arbor, Mich.
Manufacture insecticide. No. 2,100,493. Lloyd E. Smith and Houston V. Claborn, Washington, D. C., to the free use of the public.
Bleaching cellulose materials, using bleaching agent from the class of chlorine and the hypochlorites. No. 2,100,496. Maurice C. Taylor and James F. White, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.
Lubricating composition comprising mineral oil containing diethylene oxide. No. 2,100,685. George S. Cavanaugh, Los Angeles, Calif.
Process for fireproofing wood, using heated bath of an aqueous solution of ammonium chloride and acetic acid. No. 2,100,787. Daniel F. Moore, No. Bend, and Max A. Wicks, Seattle, Wash.
Soldering preparation, consisting of a metallic chloride, a metal etching acid, a monoalkyl ether derivative of ethylene glycol, and a surface tension reducing agent. No. 2,100,974. Raymond F. Neilson, Detroit, Mich.
Polishing compound, comprising mixture of water, glue, glycerin, borax and alundum. No. 2,101,050. Harry J. Hosking, Sea Cliff, N. Y.
Flowable casting syrup, comprising a preformed polymer dissolved in a monomer. No. 2,101,061. Wallace E. Gordon to du Pont, both of Wilmington, Del.
Liquid system for impregnating fibrous materials, comprising rubber latex, a stabilizing agent, and an anti-foaming agent No. 2,101,089. Izador J. Novak to Raybestos-Manhattan, Inc., both of Bridgeport, Conn.
Manufacture an anti-oxidant; reacting chlorinated paraffin wax and oleic acid with anhydrous aluminum chloride, reacting product of this reaction with lime. No. 2,101,241. Joseph Cole, Whiting, Ind., to Sinclair Refining Co., New York City.
Production cement; comprising mixture of burned argillaceous and calcareous substances, an inert unburned calcareous substance, gypsum, anhydrite and a plasticizer. No. 2,101,299. Waldo E. Tyler, Kansas City, Mo., Thos. B. Douglas, Houston, Tex., Paul R. Chamberlain and Russ A. Loveland, Dewey, Okla., to Dewey Portland Cement Co., Kansas City, Mo.
Method and apparatus for measuring properties of inks and the like. No. 2,101,322. Robt. F. Reed, Cincinnati, O., to Lithographic Technical Foundation, Inc., New York City.
Foundry core and dry binder; including core sand and a gasoline-insoluble, pine wood resin. No. 2,101,330. Wm. W. De Laney, Marshallton, Del., to Hercules Powder Co., Wilmington, Del.
Horticultural spray compound, comprising mixture of hydrocarbon and tung oils. No. 2,101,373. Frank F. Lindstaedt, Oakland, Calif.
Shellac substitute; low viscosity solution for use in varnishes, enamels, paints, or the like, or for impregnating, adhesive stiffening or waterproofing compositions; comprising masticated copal gum dissolved in ethyl alcohol. No. 2,101,398. Wilhelm Krumbhaar, Detroit, Mich.
Impregnated asbestos product; using in process base medium selected from the group of a vinyl resin and a chlorinated rubber, a plasticizer, and a pigmentary substance. No. 2,101,449. Robt. E. Parry, No. Plainfield, N. J., to Johns-Manville Corp., New York City.
Anti-freeze preparation, consisting of glycerol, and a collagenous material. No. 2,101,472. Frederick A. Kormann, Glendale, Calif.
Braided or woven packing material, yarns of which have a coating of powdered metal adhesively bonded thereon. No. 2,101,518. Hugh T. Stewart to Garlock Packing Co., both of Palmyra, N. Y.
Quaternary ammonium compounds; treating organic basic compound having at least two tertiary nitrogen atoms with an ester of a carboxylic acid containing a reactive anion. No. 2,101,524. Gerhard Balle and Kurt Eisfeld, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Coal Tar Chemicals

Process obtaining para-cresol from tar acid mixtures. No. 2,099,109. David F. Gould, Riverton, N. J., to Barrett Co., New York City.
Operating device for coke oven doors. No. 2,099,271. Charles Craib Middleton and Reginald Frank Krall to Woodall-Duckham (1920) Ltd., all of London, England.
Production anthraquinonyl thiazoles; condensing a 1-nitro-anthraquinone-6-carbonyl halide with a carbon compound. No. 2,099,672. Earl Edson Beard, Milwaukee, Wis., to du Pont, Wilmington, Del.
Preparation 1-acyl-amino-anthraquinone-6-thiazoles. No. 2,099,673. Earl Edson Beard, Milwaukee, Wis., to du Pont, Wilmington, Del.
Preparation 1-amino-6-halogen-anthraquinone; reacting 6-halogen-1-anthraquinone sulfonic acid alkali metal salts with ammonia under pressure. No. 2,100,527. Myron S. Whelen, Milwaukee, Wis., to du Pont, Wilmington, Del.
Preparation mixed chloro-fluoro anthraquinone acridones. No. 2,100,531. Alex. J. Wuertz, Carrollville, and Wm. Dettwyler, Milwaukee, Wis., to du Pont, Wilmington, Del.
Preparation fluoro compounds of anthraquinone-2, 1-benzacridone. No. 2,100,532. Alex. J. Wuertz, Carrollville, and Wm. Dettwyler, Milwaukee, Wis., to du Pont Wilmington, Del.
Preparation condensation products of 1-amino-anthraquinone 2-phenyl azomethine. No. 2,100,533. Alex. J. Wuertz, Carrollville, Wis., to du Pont, Wilmington, Del.
Continuous-vertical coking retort oven. No. 2,100,758. Paul Van Ackeren, Essen, Germany, to Koppers Co., Pittsburgh, Pa.
Coking oven retort. No. 2,100,762. Joseph Becker, Pittsburgh, Pa., to Koppers Co., corp. of Del.
Production condensation products of carbenium compounds. No. 2,100,798. Walther Dilthey and Ferdinand Quint, Bonn-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

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Preparation 4-aminodiphenyl compounds. No. 2,100,803. Morton Harris, Anniston, Ala., to Monsanto Chemical Co., St. Louis, Mo.

Preparation hydroxy compounds of the dibenzanthrone series. No. 2,101,321. Heinrich Neresheimer, Anton Vilsmeier, and Robert Held, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Preparation monoamides of dicarboxylic acids. No. 2,101,323. Paul L. Salzberg to du Pont, both of Wilmington, Del.

Coatings

Method of insulating electrical conductor with an insulating coating material. No. 2,099,103. Thos. King Cox, Balto., Md., to Western Electric Co., Inc., New York City.

Coating composition containing a drying oil having incorporated therein a positive oxidation catalyst and a controller of oxidation, comprising a reaction product of a ketone and an amine or a derivative thereof. No. 2,099,236. Robert L. Sibley, Nitro, W. Va., to Monsanto Chemical Co., St. Louis, Mo.

Coating composition containing a drying oil having incorporated therein an oxidation inhibitor comprising the reaction product of p.p'diamino diphenylmethane with beta naphthol. No. 2,099,237. Robert L. Sibley, Nitro, W. Va., to Monsanto Chemical Co., St. Louis, Mo.

Waxed paper wrapper, having along certain margins a coating of bonding material which is unreactive to wax. No. 2,099,301. Carl S. Hamersley, New York City, and Sumner C. Fairbanks, Passaic, N. J., Fairbanks assignor to Hamersley.

Coating composition including whiting, cold water paste, and powdered asbestos. No. 2,099,423. Gustave D. Fortman, Phila., Pa.

Production nitrocellulose emulsions. No. 2,099,501. John K. Speicher, Newark, Del., to Hercules Powder Co., Wilmington, Del.

Coating having as one ingredient a cellulose material. No. 2,099,570. John D. Murray to Murray Liquafilm Corp., both of Chicago, Ill.

Method making covering for surfaces exposed to weather; using coating of adhesive material. No. 2,099,571. Winfred H. Outman, Richmond, Calif., to Certain-Teed Products Corp., New York City.

Covering material for surfaces exposed to weather; using granular material in process. No. 2,099,572. Winfred H. Outman, Richmond, Calif., to Certain-Teed Products Corp., New York City.

Manufacture three-ply, semi-stiff collars; using thermoplastic adhesive coating. No. 2,100,201. Chas. C. Quenelle, Newburgh, N. Y., to du Pont, Wilmington, Del.

Protective coating for tennis strings, etc.; comprising an organic colloid and a substance to transmit oxygen upon exposure to air, being the reaction product of ammonia with the hydroxide of a divalent metal. No. 2,100,250. George Victor Heyl, Chicago, Ill., to Johnson & Johnson, New Brunswick, N. J.

Transparent, moistureproof, flexible, heat-sealable film, comprising a regenerated cellulose base having a coating thereon containing a film-forming substance and a wax material. No. 2,100,377. Merlin Martin Brubaker to du Pont, both of Wilmington, Del.

Catalytically hydrogenating mononuclear monohydric phenol which is alkyl substituted. No. 2,100,468. Merlin Martin Brubaker and Benjamin W. Howk to du Pont, all of Wilmington, Del.

Method of and apparatus for coating textile materials. No. 2,100,712. Chas. Emmey, New York City.

Nitrocellulose emulsion for formation of a continuous, non-porous, adherent film on surface of porous, absorbent material. No. 2,101,066. Cleveland B. Hollabaugh to Hercules Powder Co., both of Wilmington, Del.

Composite product comprising structurally weak metal foil element having a relatively thin adhesive and protective glass-adherent coating, consisting of vinyl acetate, phenolic resin, and chlorinated diphenyl. No. 2,101,182. Harvey G. Kittredge and Frank W. Williams to Foilfilm, Inc., all of Dayton, O.

Dyes, Stains, etc.

Production azo dyestuffs. No. 2,098,967. Max Lange, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., New York City.

Printing and dyeing compositions and processes. No. 2,099,091. Frithjof Zwilgmeyer to du Pont, both of Wilmington, Del.

Printing and dyeing compositions. No. 2,099,104. Miles Augustinus Dahlen, Wilmington, and Frithjof Zwilgmeyer, Arden, Del., to du Pont, Wilmington, Del.

Production azo dyestuffs. No. 2,099,168. Max Albert Kunz, Mannheim, and Hans Krzikalla and Walter Limbacher, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production water insoluble dyestuffs and process for use. No. 2,099,272. Heinrich Morschel, Leverkusen-Wiesdorf, and Felix Gund, Cologne-Deutz, Germany, to General Aniline Works, Inc., New York City.

Production water-soluble azo dyestuffs. No. 2,099,525. Hans Krzikalla, Heinrich Dehnert and Dieter Vossen, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Color lake composition comprising a substratum and a water-insoluble metal salt of a phthalocyanine sulfonic acid. No. 2,099,690. Karl Holzach and Georg Niemann, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production azo dyes. No. 2,100,378. James I. Carr and Crayton K. Black to du Pont, all of Wilmington, Del.

Production alkylarylanthraquinone dyestuffs. No. 2,100,392. Norman Hulton Haddock, Prestwich, and Colin Henry Lumsden, Gatley, England, to Imperial Chemical Industries, Ltd., London, England.

Preparation arylamino anthraquinone dyestuffs. No. 2,101,094. Albin Peter to Chemical Works formerly Sandoz, both of Basel, Switzerland.

Process pigmenting fibrous materials. No. 2,101,251. Ernst Gotte and Walter Kling to Bohme Fettchemie-Gesellschaft mit beschrankter Haftung, both of Chemnitz, Germany.

Explosives

Preparation ammunition priming mixture containing a thallium sulfate. No. 2,099,293. Willi Brun, Stratford, Conn., to Remington Arms Co., Inc., corp. of Del.

Fine Chemicals

Production hydrouracil compounds. No. 2,098,954. Otto Dalmer, Claus Diehl, and Hartmann Pieper, Darmstadt, Germany, to Merck & Co., Rahway, N. J.

Fluorescent screen for X-ray purposes, having incorporated therein fluorescent zinc sulfide. No. 2,099,023. Leonard Angelo Levy and Donald Willoughby West, London, England, one-half to Ilford, Ltd., Ilford, Essex, England.

Production photographic images by chemical process. No. 2,099,297. Louis Etienne Clement, Meudon-Val-Fleury, France, to Eastman Kodak Co., Jersey City, N. J.

Photographic silver halide developer. No. 2,099,374. Georg Schwartz, Anvers, Belgium, to Gevaert Photo-Production N. V., Oude God, near Anvers, Belgium.

Production light sensitive colloid layers and tanned pictures therefrom. No. 2,099,404. Gustav Kogel, Baden-Baden, and Rudolf Zahn, Wiesbaden, Germany, to Kalle & Co., Aktiengesellschaft, Wiesbaden-Biebrich, Germany.

Preparation divinyl ether stabilized with a polyphenyl. No. 2,099,695. Randolph T. Major, Plainfield, and Wm. L. Ruigh, Metuchen, N. J., to Merck & Co., Inc., Rahway, N. J.

Production tanned pictures, using light sensitive layer comprising a colloidal substance and a light sensitive aromatic diazo compound of high molecular weight. No. 2,100,063. Rudolf Zahn, Wiesbaden, Germany, to Kalle & Co., Aktiengesellschaft, Wiesbaden-Biebrich, Germany.

Color photography process; using chemical emulsion and waterproofing material. No. 2,100,224. Francis H. Snyder and Henry W. Rimbach to Francis H. Snyder, Inc., all of New York City.

Solution for discharging dye in presence of silver and dissolving a silver image in color photography, comprising water, sodium sulfite, and thiourea. No. 2,100,594. Gerd Heymer, Dessau-in-Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Glass and Ceramics

Production laminated glass, including layer of optically clear plastic comprising a hydrolyzed mixed ester of cellulose. No. 2,099,086. John S. Tinsley, New Brunswick, N. J., to Hercules Powder Co., Wilmington, Del.

Enameling process. No. 2,099,340. Karl Kautz, Massillon, O., to Republic Steel Corp., Youngstown, O.

Method compounding ceramic materials; using a binder and non-plastic material in process. No. 2,099,367. Jacques Gustave Adolphe Lefranc, Paris, France.

Production luminescent glass; containing in solution a luminescence-affording compound of tin, and having an iron oxide content. No. 2,099,602. Hellmuth Fischer, Ilmenau, Germany.

Manufacture zirconium oxide opacifier. No. 2,100,337. Chas. J. Kinzie, Niagara Falls, N. Y., to Titanium Alloy Mfg. Co., New York City.

Clear vitreous compositions or glasses obtained by fusion, comprising an oxidic component and a vitrefying component. No. 2,100,391. Hans Georg Grimm, Heidelberg, and Paul Huppert, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture transparent article in form of a tube or like, comprising a homogeneous mass of predetermined thickness composed of laminations of transparent cellulosic sheet material tightly adhered and contracted on base of glass. No. 2,101,128. Chas. A. Cabell, Washington, D. C., to Economy Fuse & Mfg. Co., Chicago, Ill.

Industrial Chemicals, etc.

Production nitric acid. No. 2,098,953. Axel Christensen, Rye, N. Y., to Chemical Construction Corp., corp. of Del.

Method carrying out aeration in biochemical processes. No. 2,098,962. Rudolph Hellbach, Washington, D. C., to Henry A. Wallace, for Government of the U. S.

Production vanillin from waste sulfite liquor, by addition to liquor of an alkaline agent. No. 2,099,014. Raymond S. Hatch, Longview, Wash., to Weyerhaeuser Timber Co., Tacoma, Wash.

Production coarsely crystalline ammonium sulfate; crystallization of salt from aqueous non-acid compounds containing soluble chromium compounds. No. 2,099,079. Karl Rumscheidt and Anton Stryzewski, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Process forming sulfuric esters of unsaturated higher alcohols. No. 2,099,214. Walter H. McAllister, Wyoming, Ohio, to Procter & Gamble Co., Cincinnati, Ohio.

Manufacture thorium oxide very capable of reaction and its transformation into thorium salts. No. 2,099,325. Rudolf Zellmann and Richard Muller, Radebeul, Germany, to Chemische Fabrik von Heyden, A. G. Radebeul, near Dresden, Germany.

Method hardening soils containing colloidal clay, using an aluminum compound in process. No. 2,099,328. Leo Casagrande, Berlin-Charlottenburg, Germany.

Preparation halide esters of polyunsaturated alcohols. No. 2,099,357. James H. Werntz to du Pont, both of Wilmington, Del.

Manufacture casein, using a dilute acid in process. No. 2,099,379. John Robert Spellacy, Millbrae, Calif., to Hercules Powder Co., Wilmington, Del.

Purification of synthetically produced alcohols. No. 2,099,475. Johann Giesen, Helmut Hanisch, and Martin Dally, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture propyl chloride from propylene, contacting propylene and hydrogen chloride in presence of a catalyst consisting of stannic chloride. No. 2,099,480. Eric B. Hjerpe, Pittsburgh, and Wm. A. Gruse, Wilkinsburg, Pa., to Gulf Oil Corp., corp. of Pa.

Preparation esters of formals. No. 2,099,757. Geo. W. Seymour, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Preparation tetraalkyl thiuram monosulfides. No. 2,099,773. Norman C. Somers, Carneys Point, N. J., to du Pont, Wilmington, Del.

Composition adapted to react with hydroxy compounds to produce phosphorus oxy-chloride and compounds in which the hydroxyl group is replaced by a chlorine atom. No. 2,099,781. Wm. Robt. Waldron to du Pont, both of Wilmington, Del.

Electrolytic apparatus for preparing chemical solutions. No. 2,099,801. Roy Blair Everson, Chicago, Ill.

Preparation isopropyl sulfates. No. 2,099,814. Arthur Whitney Larchar to du Pont, both of Wilmington, Del.

Manufacture secondary alcohols by reaction of acids with olefins. No. 2,099,855. Robert B. Lebo, Elizabeth, N. J., and Benjamin T. Brooks, Old Greenwich, Conn., to Standard Alcohol Co., corp. of Del.

Manufacture distilled spirits. No. 2,099,864. Fred E. Miller, Phila., Pa., to Semet Solvay Engineering Corp., New York City.

Dealkylation of alkyl-aryl ethers. No. 2,100,228. John M. Tinker, Penns Grove, and Viktor M. Weinmayr, Pitman, N. J., to du Pont, Wilmington, Del.

Preparation 2-chloro-5-amino-benzoic acid. No. 2,100,242. Robert Freeman Deese, Jr., to du Pont, both of Wilmington, Del.

Purification vegetable and animal oils containing free fatty acid, using an alkali in process. No. 2,100,274. Benjamin Clayton, Houston, Tex., Walter B. Kerrick, Los Angeles, and Henry M. Stadt, Glendale, Calif., to Refining Inc., Reno, Nevada.

Purification glyceride oils containing free fatty acid and color impurities, using a saponifying reagent in process. No. 2,100,275. Benjamin Clayton, Sugarland, Tex., Walter Barnes Kerrick, Los Angeles, Henry

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M. Stadt, Glendale, Calif., and Benjamin H. Thurman, Bronxville, N. Y., to Refining, Inc., Reno, Nevada.

Continuous process refining glyceride type oils, using alkaline reagent in process. No. 2,100,276. Benjamin Clayton, Houston, Tex., to Refining, Inc., Reno, Nevada.

Continuously centrifugally separating soap stock from alkali treated glyceride oils. No. 2,100,277. Benjamin Clayton, Houston, Tex., to Refining, Inc., Reno, Nevada.

Production solubilized higher aliphatic sulfides. No. 2,100,297. Alfred Wm. Baldwin and Henry Alfred Piggott, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Process for heat-treating a distillable carbonaceous material with a hydrogenating gas. No. 2,100,352. Mathias Pier, and Walter Simon, and Paul Jacob, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Treatment distillable carbonaceous materials with added hydrogen or an added gas containing free hydrogen. No. 2,100,354. Mathias Pier, Heidelberg, and Walter Simon and Georg Grassl, Ludwigshafen-am-Rhine, Germany, to Standard-I. G. Co., Linden, N. J.

Manufacture ortho-and peri-alkyl dinitriles. No. 2,100,401. Reginald Patrick Linstead, So. Kensington, London, and Arthur Reginald Lowe, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Treatment and hardening of an oxidized oil having double bonds in conjugated arrangement, first adding reactive volatile organic substance to oil in excess. No. 2,100,484. Walter J. Koenig to Sloane-Blabon Corp., both of Trenton, N. J.

Apparatus for separation solid materials of different specific gravity. No. 2,100,670. George Raw, Ravenswood, Low Fell, England.

Recovery sulfur dioxide from dilute sulfur dioxide gases; treating gases with mixture of water, zinc oxide and distillate from the destructive distillation of wood to produce zinc sulfite. No. 2,100,792. Frank E. Townsend, Bartlesville, Okla.

Continuous process for production aralkyl halides; reacting a di-aralkyl ether with a hydrogen halide in presence of an aqueous solution of a heavy metal halide. No. 2,100,822. Harold M. Spurlin to Hercules Powder Co., both of Wilmington, Del.

Method and apparatus for performing pyrogenetic reactions. No. 2,-100,823. Chas. A. Thomas, Dayton, O., to Monsanto Chemical Co., St. Louis, Mo.

Production potassium formate. No. 2,100,827. Erich Wiedbrauck, Essen-Ruhr, Germany, to Chemische Fabrik Buckau, Ammendorf (Saalkreis), Germany.

Preparation solid, alkali sub-silicates; using molten caustic alkali in process. No. 2,100,944. Richard Lloyd Davies to Penn Salt Mfg. Co., both of Phila., Pa.

Manufacture organic sulfur compounds, wherein a polyhalogenated aliphatic compound is acted upon with an inorganic non-oxidized metal compound of sulfur. No. 2,100,968. Leon Lilienfeld, Vienna, Austria.

Preparation esters of alpha-methacrylic acid and primary monohydric alcohols containing more than five carbon atoms. No. 2,100,993. Herman A. Bruson, Elkins Park, Pa., to Rohm & Haas Co., Phila., Pa.

Recovery an aralkyl ether of cellulose in form of a firm, porous granular precipitate from mixture resulting from reaction leading to its formation. No. 2,101,032. Eugene J. Lorand to du Pont, Wilmington, Del.

Preparation manganese compounds of nucleotides and their hydrolytic decomposition products. No. 2,101,099. Simon L. Ruskin to Frances R. Ruskin, both of New York City.

Production dicarboxylic acids and esters. No. 2,101,217. Julian W. Hill and Edgar W. Spanagel to du Pont, all of Wilmington, Del.

Preparation polycarboxylic acid esters of poly-unsaturated higher alcohols. No. 2,101,227. James H. Werntz to du Pont, both of Wilmington, Del.

Manufacture krypton and xenon by separation from atmospheric air. No. 2,101,300. Andre Weil, Paris, France, to Air Reduction Co., Inc., New York City.

Recovery oil from cocoanut. No. 2,101,371. Vicente G. Lava, Manila, P. I.

Leather

Preparation sole leather; first tanning hides with sulfite cellulose extract, then filling with silicic acid solution. No. 2,101,511. Otto Rohm, Darmstadt, Germany.

Metals, Alloys, Ores

Froth flotation process for ore treatment, using a water-soluble salt of an organic dicarboxylic acid as flotation agent. No. 2,099,120. James Emory Kirby and James Herbert Werntz, to du Pont, all of Wilmington, Del.

Production magnesium from magnesium oxides. No. 2,099,151. Adolf Vogt, Tschechnitz, near Breslau, Germany, to Dr. Alexander Wacker Gesellschaft fur Elektrochemische Industrie, G. m. b. H., Munich, Germany.

Apparatus for preventing oxidation of metals. No. 2,099,208. Wm. H. D. Horsfall and Maunsell B. Jackson, Toronto, Ont., Canada.

Production pure alumina and crude potassium sulfate from alunite. No. 2,099,360. Sadao Yonemura, Koishikawa-ku, Tokyo, Tsuruji Okazawa, Shibuya-ku, Tokyo, and Kota Osada, Sakai, Edogawa-ku, Tokyo, Japan, to Nihon Denki Kogyo Kabushiki Kaisha, Tokyo, Japan.

Compensating spring having high elastic limit and variable modulus of elasticity at different temperatures, consisting of an alloy comprising nickel, chromium, manganese, silicon, titanium, and iron. No. 2,099,474. Frederick P. Flagg to Waltham Watch Co., both of Waltham, Mass.

Forgeable steel alloy characterized by being stable against demolybdenization and decarburization at its hot working temperature, consisting of molybdenum, chromium, carbon, another metal, and iron. No. 2,099,509. Edgar F. Blessing, East Orange, N. J.

Electrical switch contact, containing lead, cadmium, and a metal from the group of silver and copper. No. 2,099,551. Lyall Zickrick, Schenectady, N. Y., to General Electric Co., corp. of New York.

Preparation metallic chromate by electrolysis of an alkali bichromate solution without the addition of salts or other acids. No. 2,099,658. Richard Edgar Pearson and Walter Villa Gilbert, London, England, Pearson assignor to Gilbert.

Apparatus and process for deposition of metallic films from metal vaporized in vacuo. No. 2,100,045. Paul Alexander, Brussels, Belgium.

Manufacture pig iron. No. 2,100,086. Max Paschke, Clausthal-Zellerfeld, and Eugen Peetz, Duisburg-Huttenheim, Germany, to H. A. Brassert & Co., Chicago, Ill.

Method coating metal articles with zinc. No. 2,100,179. Allan Heathcote Williams, Chester, England.

Manufacture composite bodies of aluminum and zinc. Nos. 2,100,255-6. Clayton E. Larson, Louisville, Ky., to Reynolds Metals Co., New York City.

Composite body of magnesium and aluminum. No. 2,100,257. Clayton E. Larson, Louisville, Ky., to Reynolds Metals Co., New York City.

Manufacture composite bodies of copper and aluminum, or copper and magnesium. No. 2,100,258. Clayton E. Larson, Louisville, Ky., to Reynolds Metals Co., New York City.

Manufacture metal alloys. No. 2,100,265. Rene Perrin to Societe d' Electrochimie d'Electrometallurgie et des Acieres Electriques d'Ugine, both of Paris, France.

Method and apparatus for utilizing molten material in heat treatment of liquids not miscible with the molten material. No. 2,100,355. Wm. O. Pray to Pray Research Corp., both of De Beque, Colo.

Oxygen cutting apparatus. No. 2,100,384. Geo. M. Deming, East Orange, N. J., to Air Reduction Co., Inc., New York City.

Method increasing corrosion resistance of aluminum alloys and resulting products. No. 2,100,411. Otto Reuleaux, Hanover, Germany, to Vereinigte Leichtmetall-Werke Gesellschaft mit Beschrankter Haftung, Hanover, Germany.

Covered electrode for metallic arc welding, consisting of a metal rod of nickel or nickel alloy, having a heavy covering comprising titanium oxide, wood flour, ferro-manganese, and silica. No. 2,100,545. Hugo W. Hiemke to A. O. Smith Corp., both of Milwaukee, Wis.

Treatment alkaline cyanide solution containing dissolved precious metals, to effect precipitation of same, first mixing zinc dust with alkali bisulfite in aqueous solution. No. 2,100,865. Louis D. Mills and Thos. B. Crowe, Palo Alto, and Joye C. Haun, San Francisco, Calif., to Merrill Co., San Francisco, Calif.

Anode for an electrolytic cell, for production of aluminum, made from carbon paste. No. 2,100,927. Raffaele Trematore, Mori, Trento, Italy, to Det Norske Aktieselskab for Elektrokemisk Industri, Oslo, Norway.

Copper base alloy composed of copper, nickel, aluminum, and zinc. No. 2,101,087. Elmer L. Munson, Naugatuck, Conn., to American Brass Co., Waterbury, Conn.

Production aluminum alloy consisting of aluminum, copper, tin, nickel, magnesium, manganese, and silver. No. 2,101,118. Henry L. Whitman, Los Angeles, Calif.

Separator for a lead-acid storage battery having diaphragm of porous material impregnated with mercurous nitrate. No. 2,101,326. Joseph Lester Woodbridge to Electric Storage Battery Co., both of Phila., Pa.

Production low carbon, high chromium cast iron. No. 2,101,426. Chas. O. Burgess, Niagara Falls, N. Y., to Union Carbide & Carbon Corp., New York City.

Paper and Pulp

Method manufacturing paper pulp from linen rags, using solution of water, sulfur, calcium oxide, and sodium carbonate. No. 2,099,399. Edwin P. Jones, Garden City, L. I., N. Y., to Champagne Paper Corp., New York City.

Improved method producing bleached pulp from flax or hemp tow, using solution of water, sodium hydroxide and sulfur. No. 2,099,400. Edwin P. Jones, Garden City, L. I., N. Y., to Champagne Paper Corp., New York City.

Petroleum Chemicals

Hydrocarbon fuel burning system. No. 20,557. Reissue. Frank V. Risinger, Lakewood, O.

Process desulfurizing petroleum hydrocarbons, contacting vapors with a catalyst consisting of crude mineral ore containing a zinc compound. No. 2,098,943. Albert E. Buell and Walter A. Schulze to Phillips Petroleum Co., all of Bartlesville, Okla.

Conversion hydrocarbons, by contact with a vitreous gel catalyst comprising chromium oxide and a difficultly reducible oxide. No. 2,098,959. Frederick E. Frey and Walter F. Huppke to Phillips Petroleum Co., all of Bartlesville, Okla.

Hydrogenation unsaturated hydrocarbons, by contacting same with a vitreous gel catalyst comprising chromium oxide and a difficultly reducible oxide. No. 2,098,960. Frederick E. Frey and Walter F. Huppke to Phillips Petroleum Co., all of Bartlesville, Okla.

Dewaxing oils; conditioning same preparation to separation of wax therefrom, mixing wax and oil with a wax separation aid containing cholesterol. No. 2,099,190. Chas. Douglas Barnes, Long Beach, Calif., and Marcellus T. Flaxman, Wilmington, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Halogenation of unsaturated compounds. No. 2,099,231. Jan D. Ruys, Pittsburgh, and James W. Edwards, Concord, Calif., to Shell Development Co., San Francisco, Calif.

Apparatus and process for pyrolysis of hydrocarbons. No. 2,099,350. Wesley C. Stoesser to Dow Chemical Co., both of Midland, Mich.

Art of cracking hydrocarbons. No. 2,099,426. Eugene C. Herthel, Flossmoor, Ill., to Sinclair Refining Co., New York City.

Process blowing asphalt-producing petroleum base materials. No. 2,-099,434. Albert B. Culbertson, Jr., St. Louis, Mo., to Standard Oil Co., Chicago, Ill.

Continuous production blown asphalt, first introducing petroleum base material into a reaction zone. No. 2,099,448. Claude P. McNeil, Whiting, Ind., and Samuel A. Montgomery, Wood River Ill., to Standard Oil Co., Chicago, Ill.

Fractionally separating a mixture of non-fluid hydrocarbon polymers. No. 2,099,513. Martin de Simo and Frederick B. Hillmer, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Recovery petroleum sulfonic acid compounds of low iron content. No. 2,099,529. Robert C. Moran, Wenonah, and Walter A. Meyer, Paulsboro, N. J., to Socony-Vacuum Oil Co., Inc., New York City.

Treatment mineral oils; contacting a lubricating oil of Penna. grade with phenyl ethyl alcohol, under conditions causing formation of two liquid phases, and separating said phases to produce oil portions of higher and lower gravity index. No. 2,099,615. Wilbert B. McCluer and Merrill R. Fenske, State College, Pa., to Pennsylvania Petroleum Research Corp., corp. of Pa.

Method for cracking oils in the vapor phase. No. 2,099,668. Percy C. Keith, Jr., Peapack, N. J., to Gasoline Products Co., Inc., Newark, N. J.

Treatment hydrocarbon oil-wax mixture. No. 2,099,683. Seymour W. Ferris, Aldan, Willard F. Houghton, Swarthmore, and Henry C. Cowles, Jr., Phila., Pa., to Atlantic Refining Co., Phila., Pa.

Method decomposing hydrocarbon oils. No. 2,099,718. Wm. H. Bahlke, Robert F. Ruthruff, and Frederick W. Sullivan, Jr., Hammond, Ind., to Standard Oil Co., Whiting, Ind.

Treatment tri-hydric phenols to produce alkyl derivatives. No. 2,099,-738. Vladimir Ipatieff to Universal Oil Products Co., both of Chicago, Ill.

U. S. Chemical Patents

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Production hydrocarbon oil, boiling within the motor-fuel boiling-point range, from hydrocarbon gases containing gaseous olefins. No. 2,099,755. Robert F. Ruthruff, Hammond, Ind., to Standard Oil Co. (Ind.), Chicago, Ill.

Apparatus for purifying oil. No. 2,099,824. Chas. R. Reeves and Cecil R. Gentry, both of Oklahoma City, Okla.

Production gasoline from cracked naphtha. No. 2,099,835. Edwin H. Barlow, Hillside, and Amiot P. Hewlett, Cranford, and Paul E. Kuhl, Elizabeth, N. J., to Standard Oil Development Co., corp of Del.

Improved motor fuel for high compression engines, comprising a hydroformed oil to which pure benzol has been added. No. 2,099,850. Frank A. Howard, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Emulsifiable oil, comprising a hydrocarbon oil compounded with Koeme oil. No. 2,099,894. Arthur Gustav Kaufmann, Associated, Calif., to Tide Water Associated Oil Co., corp. of Del.

Method processing heavy hydrocarbon oil to produce gasoline. No. 2,099,907. Marvin C. Rogers to Standard Oil Co. (Ind.), both of Chicago, Ill.

Preparation anhydrides by use of ketenes. No. 2,099,909. Karl T. Steik, Clifton, and Anthony H. Gleason, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Treatment hydrocarbon oil. No. 2,099,919. Maurice H. Arveson, Highland, Ind., to Standard Oil Co., Chicago, Ill.

Treatment heavy hydrocarbon oil for production of gasoline. No. 2,099,920. Harold V. Atwell, White Plains, N. Y., to Gasoline Products Co., Inc., Newark, N. J.

Recovery and purification hydrocarbon oil. No. 2,100,011. Malvin R. Mandelbaum, New York City, to Gray Processes Corp., Newark, N. J.

Hydrocarbon oil cracking process. No. 2,100,048. Cecil E. Beatie, Forest Hills, N. Y., to Power Patents Co., Jersey City, N. J.

Cracking hydrocarbon oil. No. 2,100,062. John W. Throckmorton, New York City, to Gyro Process Co., Detroit, Mich.

Solvent refining mineral oil. No. 2,101,497. James H. Grahame, Mt. Vernon, N. Y., to Texas Co., New York City.

Hydrocarbon oil conversion. No. 2,101,517. Jean Delattre Seguy to Universal Oil Products Co., both of Chicago, Ill.

Manufacture black wax from petrolatum stock. No. 2,100,070. Aubrey D. David, Clarendon, Pa., to Petroleum Processes Corp., Wichita, Kans.

Refining lubricating oil with dichloroethyl ether. No. 2,100,099. Clifford C. Buchler and James M. Page, Jr., Casper, Wyo., to Standard Oil Co., Chicago, Ill.

Treatment hydrocarbon oil. No. 2,100,283. Percival C. Keith, Jr., Port Washington, N. Y., to Gasoline Products Co., Inc., Newark, N. J.

Hydrocarbon fuel of the gasoline or kerosene type. No. 2,100,287. Victor Conquest to Armour & Co., both of Chicago, Ill.

Production hydrocarbons of low boiling point. No. 2,100,353. Mathias Pier, Heidelberg, and Ernst Donath, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Conversion hydrocarbon oils. No. 2,100,414. Kenneth Swartwood to Universal Oil Products Co., both of Chicago, Ill.

Solvent extraction of oil by a selective solvent into an extract phase. No. 2,100,429. Ulric B. Bray, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Production anhydrous hydrocarbon derivatives. No. 2,100,437. Wm. Engs, Oakland, and Gerald Henry van de Griendt, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Dewaxing petroleum oils. No. 2,100,662. Arthur L. Lyman and Melvin M. Holm, Berkeley, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.

Process refining liquid petroleum oil fractions, using acetic acid in process. No. 2,100,707. Shanti Swarupa Bhatnagar, Lahore, India, to Steel Bros. & Co., Ltd., London, England.

Conversion hydrocarbon oils. No. 2,100,849. Jacob B. Heid to Universal Oil Products Co., both of Chicago, Ill.

Removal wax from hydrocarbon oil. No. 2,100,915. Ernest F. Pevere, Beacon, N. Y., to Texas Co., New York City.

Pigments, Dry Colors and Fillers

Manufacture pigment containing zirconium. No. 2,099,019. Chas. J. Kinzie, Niagara Falls, N. Y., to Titanium Alloy Mfg. Co., New York City.

Resins, Plastics, etc.

Manufacture polyhydric alcohol-polybasic acid resins; condensing together the mono-ester of an organic polybasic acid composition and at least one polyhydric alcohol. No. 2,098,964. Rowland Hill and Eric Everard Walker, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Manufacture flexible articles, treating metallic base material with an interpolymer of a monomeric alpha-substituted acrylic acid ester with a different monomeric polymerizable compound. No. 2,099,047. George Burt Bradshaw to du Pont, both of Wilmington, Del.

Preparation hydrogenated resin acid esters. Nos. 2,099,066-7. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Manufacture hydrocarbon resins. No. 2,099,090. Wm. L. Webb to Standard Oil Co., both of Chicago, Ill.

Production reaction product of dipentene-maleic anhydride and an alcohol. No. 2,099,486. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Preparation synthetic resin consisting of condensation product of phenol-phthalein, rosin, and a non-essential vegetable oil. No. 2,099,510. Edmond H. Bucy and Robert Watkins, Waukegan, Ill., to Atlas Powder Co., Wilmington, Del.

Plastic material, comprising a caoutchouc base material, insoluble pulverulent or granular addition material, and, as dispersing agent, a derivative of a high molecular alcohol. No. 2,099,651. Ernst Helft, Berlin-Halensee, Germany, to "Unichem" Chemikalien Handels A.-G., Zurich, Switzerland.

Manufacture shaped products impermeable to moisture from cellulose formate and derivatives of cellulose formate; coating shaped product with a varnish, which contains water-repelling substances and formic acid. No. 2,099,812. Walter Konig, Wiesbaden, Germany, to Rudolph Koepp & Co., Chemische Fabrik A. G., Oestrich in Rheingau, Germany.

Slide for light sensitive photographic material which comprises a polymerized vinyl chloride containing chlorine. No. 2,099,976. Max Hagedorn, Dessau in Anhalt, Germany, to I. G. Frankfort-am-Main, Germany.

Manufacture plastic substances; chlorinating gaseous products consisting of hydrocarbons of the olefin type obtained from cracked petroleum hydrocarbons, and treating with an alkaline polysulfide solution. No. 2,100,351. Joseph C. Patrick, Trenton, N. J.

Method and apparatus for feeding thermoplastic material. No. 2,100,760. Frank L. O. Wadsworth, Pittsburgh, Pa., to Ball Bros. Co., Muncie, Ind.

Production interpolymerization products. No. 2,100,900. Hans Fikentscher, Ludwigshafen-am-Rhine, and Josef Hengstenberg, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Process molding methacrylic acid esters. No. 2,101,107. Daniel E. Strain to du Pont, both of Wilmington, Del.

Preparation resinous aminomethanol-aromatic amine-formaldehyde condensation products. No. 2,101,215. Geo. D. Graves and Jesse Harmon to du Pont, all of Wilmington, Del.

Production synthetic resins. Nos. 2,101,332-3. Walter Frankenburger, Herbert Hammerschmid, and Georg Roessler, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production urea-formaldehyde condensation products in a fluffy form, free from lumps and caked particles. No. 2,101,534. Donald Edwards Edgar, Phila., Pa., to du Pont, Wilmington, Del.

Rubber

Pliable printing plate having zero lateral stretch, comprising printing surface of pliable cured rubber, and an integrally associated reinforcing element comprising a pliable layer of resin-filled fibrous material. No. 2,099,154. Gilbert C. Waters to Econo Products, Inc., both of Rochester, N. Y.

Preparation rubber conversion products; dissolving rubber in an inert solvent and adding tin tetrachloride to resulting cement. No. 2,099,318. Lorin B. Sebrell, Silver Lake, O., to Wingfoot Corp., Wilmington, Del.

Production condensation derivatives of rubber; first treating rubber cement with a condensation agent. No. 2,099,546. Herman B. Thies, Stow, and Geo. R. Lyon, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.

Production vulcanized rubber; incorporating a vulcanizing agent, an activatable type of organic accelerator, and a neutral salt of a diaryl guanidine. No. 2,100,085. Henry O. Newman, Waterbury, Conn., to U. S. Rubber Co., New York City.

Method vulcanizing rubber; incorporating in rubber mix an acidic type sulfur containing accelerator and a diaryl guanidine sulfate. No. 2,100,370. Ira Williams, Woodstown, N. J., to du Pont, Wilmington, Del.

Production vulcanized rubber; heating rubber and sulfur in presence of a vulcanization accelerator comprising reaction product of a saturated aromatic primary amine and a thiazyl disulfide. No. 2,100,692. Marion W. Harman, Nitro, W. Va., to Monsanto Chemical Co., Wilmington, Del.

Method preserving rubber; treating same with product obtainable by treating 2,2,4-trimethyldihydro-quinoline with a strong non-oxidizing mineral acid, and in addition a diaryl p-phenylene diamine as an activator. No. 2,100,998. Robert L. Sibley, Nitro, W. Va., to Monsanto Chemical Co., St. Louis, Mo.

Manufacture unvulcanized rubber product having a non-tacky surface. No. 2,100,714. Glen S. Hiers, Bala-Cynwyd, Pa., to Collins & Aikman Corp., Phila., Pa.

Manufacture ribbed microporous separators, using reticulous rubber gel in process. No. 2,101,206. Leland E. Wells, Cleveland Heights, O., to Willard Storage Battery Co., Cleveland, O.

Process stabilizing chlorinated rubber; emulsifying solution of chlorinated rubber in carbon tetrachloride with an aqueous solution of sodium bisulfite. No. 2,101,223. Joseph Grange Moore, Runcorn, England, to Imperial Chemical Industries, Ltd., London, England.

Textiles, Rayon

Production imitation spun yarn having broken and unbroken filaments of cellulose acetate. No. 2,098,980. Percy Frederick Combe Sowter, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Production imitation spun yarn. No. 2,098,981. Percy Frederick Combe Sowter, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Spinning solution, for manufacture artificial fabrics and films by dry spinning processes, which comprises cellulose acetate, a volatile organic solvent, and fine particles of an inorganic pigment. No. 2,099,004. Henry Dreyfus, London, England.

Production or treatment artificial filaments, etc., comprising organic derivatives of cellulose. No. 2,099,005. Henry Dreyfus, London, England.

Process and apparatus for utilization of artificial thread. No. 2,099,178. Arthur L. Snyder, Garden City, L. I., N. Y., to du Pont, Wilmington, Del.

Production hairy rayon yarn. No. 2,099,215. James E. Moore, Rome, Ga., to Tubize Chatillon Corp., New York City.

Apparatus for liquid-treatment of fine filamentous thread. No. 2,099,338. Chas. A. Huttinger, Lakewood, O., to Acme Rayon Corp., Cleveland, O.

Rayon finishing process; impregnating yarn with an emulsion of stearic anhydride in a solution of deacetylated chitin in dilute aqueous acetic acid. No. 2,099,363. Winfield W. Heckert, Arden, Del., to du Pont, Wilmington, Del.

Apparatus for and method of preparing spun yarn. No. 2,099,766. Leon W. Weinberg, Phila., Pa., to Celanese Corp. of America, corp. of Del.

Manufacture textiles; using organic acid esters of cellulose hydroxy alkyl ethers. No. 2,100,369. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Process impregnating cellulose acetate filaments, threads, etc., subjecting same to action of ethanol and treatment with a viscose solution. No. 2,100,385. Henry Dreyfus, London, England.

Regenerated cellulose structures. No. 2,100,398. Emil Kline, Buffalo, N. Y., to du Pont, Wilmington, Del.

Spinneret treatment in manufacture artificial silk. No. 2,100,581. Johannes Gerardus Weeldenburg, Arnhem, Netherlands, to American Enka Corp., Enka, N. C.

Apparatus for manufacture wool-like artificial fibers. No. 2,100,588. Walter Claus to Zellstofffabrik, Waldhof, both of Mannheim-Waldhof, Germany.

Spinning funnel for use in manufacture artificial silk. No. 2,100,595. Cornelis Gerrit Jansen, Arnhem, Netherlands, to American Enka Corp., Enka, N. C.

Production artificial threads or filaments; using solution containing an ether derivative of cellulose in solution in a solvent liquid. No. 2,100,969. Leon Lilienfeld, Vienna, Austria.

Official Chemical Specifications

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To secure copies of specifications order both by name and number:

A.S.T.M.: American Society for Testing Materials, 260 So. Broad St., Philadelphia. Prices of individual specifications vary. All specifications are published in the "Book of the A.S.T.M. Standards." Tentative Standards are published collectively and annually. Price to non-members, $7 paper, $8 cloth.

A.S.A.: American Standards Association, 29 W. 39th St., New York City, price 25c each.

U. S. Federal: Issued by Procurement Division, Treasury Department, for sale by Supt. Documents, Washington, D. C., 5c each.

U. S. War: Issued by War Department which has adopted Federal Specifications (see above), and special departmental specifications, indicated in the second column as follows:

Q: Quartermasters Corps, U.S.A., Washington, D. C.
M: Medical Dept., U.S.A., Washington, D. C.
E: Corps of Engineers, U.S.A., Washington, D. C.
S: Signal Corps, U.S.A., Washington, D. C.
CW: Chemical Warfare Service, U.S.A., Edgewood Arsenal, Maryland.
A: Air Corps, U.S.A., Dayton, Ohio.
CA: Coast Artillery Corps., U.S.A., Washington, D. C.

U. S. Navy: Bureau of Supplies and Accounts, Navy Department, Washington, D. C.

N. Y. City: Dept. Purchases, Municipal Bldg., Manhattan.

PRODUCT	A. S. T. M.	A. S. A.	U. S. Federal	U. S. War		U. S. Navy	N. Y. City
Acetate Ester of Cellosolve 95-96%	D343-35						
Acetic Anhydride (for dope)				4-26	A		
Acetone	D329-33		O-A-51a	O-A-51a		O-A-51a	
Dimethylketone				50-11-32	O		
Acetylene Tetrachloride				4-502-12	C		
Acid, Acetic (tech.)			O-A-76	O-A-76		O-A-76	
Mixed (smokeless pwdr.)						51A3	
Mixed (for nitrating)				50-11-7	O		
Monochloracetic				4-503-15	C		
Muriatic				4-7	Q	51A8	
Nitric				42.2-94	E	51A7	
Nitric (for amm. nitrate)				50-11-5	O		
Nitric (for mer. fulminate)				50-11-3	O		
Nitric (for mixed acid)				50-11-6	O		
Nitric (for picric acid)				50-11-4	O		
Nitric (testing methods)				50-25-2	O		
Oxalic (tech.)			O-A-91	O-A-91			
Phosphoric				75-18	S		
Picric				50-13-2	O		
Stearic (for ammunition lding.)				50-11-47	O		
Sulfuric (for storage batteries)			O-A-111				
Sulfuric (conc., electrolyte)						51A2d	
Sulfuric (pickling)						51A6a	
Sulfuric (and electrolyte for batteries)				W-B-131a			
Sulfuric (and oleum)				50-11-1	O		
Sulfuric (testing methods)				50-25-1	O		
Sulfuric (storage batteries)				O-A-111			
Acrol (Diamidophenol)				75-4	S		
Agar (bacteriological)				4-1041	M		
Albumen, egg				42.2-1	E		
Alcohol				3-20	Q	52A8a	10-A-71:36T
Ethyl				4-1018	O		
Alum. Pot. Sulfate (photographic)			O-A-421	O-A-421		O-A-421	
Stearate						51A11	
Alum, pwdr.				42.2-96	E		
Ammonia, anhyd.						51A5b	
Aqua (tech.)			O-A-451	O-A-451		O-A-451	
Caustic				75-19	S		
Ammonium Bichromate				75-20	S		
Carbonate (lump, for metal-fouling sol.)				4-16A	O		
Chloride (sal ammoniac)			O-A-491	O-A-491		O-A-491	
Nitrate				50-11-59	O		
Perchlorate				4-503-35	C		
Persulfate (for metal-fouling sol.)				4-17	O		
Picrate						51P11a	
Picrate (explosive D)				50-13-3B	O		
Amyl Acetate Secondary				4-1045	A		10-A-118
Acetate (tech.)	D318-36			3-21B	Q		
Alcohol (synth.)	D319-33						
Alcohol, Secondary				4-1047	A		
Antimony Sulfide (for primers)				50-11-14	O		
Arabic Gum				50-11-15A	O		
Arsenic Disulfide				4-1034	O		
Trichloride				4-503-45	C		
White				4-503-50	C		
Barium Chlorate				50-11-57	O		
Nitrate				50-11-46A	O		
Nitrate (for an ingredient of primers)				50-11-20	O		
Beeswax				4-11	Q		
Benzene				4-1016B	O		
Benzine (tech.)							10-B-12
Benzol	D361-36			2-58B	A	51B3C	
Blanc Fixe (dry and in oil)				3-43B	Q	52B9C	

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PRODUCT	A. S. T. M.	A. S. A.	U. S. Federal	U. S. War		U. S. Navy	N. Y. City
Blue Lead, Basic Sulfate (dry & paste-in-oil)			TT-B-486	TT-B-486			
Boneblack, paste-in-Japan, paste-in-oil	D210-30		TT-B-601	TT-B-601		TT-B-601	
Borax (sod. borate)			SS-B-611	SS-B-611		SS-B-611	
Acetate (for aircraft dope)				4-27	A		
Acetate, normal 88-92%	D303-33						
Acetate, Secondary				4-1049	A		
Alcohol	D304-33			4-503-85	C		
Propionate (90-93%)	D320-33						
Cadmium Oxide				4-1044	A		
Calcium Arsenate (powdered)							5-1-4 :37T
Carbide			O-C-101	O-C-101		O-C-101	
Chloride	D98-34			4-503-90	C	51C4e	
Chloride (analysis methods)	D345-34						
Phosphide						51C2C	
Resinate				50-11-89	O		
Carbon Black (lamp black)				4-503-105	C		
Dioxide				4-503-95	C	51C16b	
Tetrachloride				4-503-110A	C		
Charcoal			LLL-C-251	LLL-C-251		LLL-C-251	
(coconut shell, crude)				97-52-46	C		
(for black pwdr.)				50-11-42A	O		
Chemicals, Industrial							10-C-57 :37T
Chloracetophenone				96-111-8	C		
Chlorine, Liquid				4-503-130	C		10-C-54 :37T
				4-1	Q		
Chloroform (anaesthetic)				4-1008	M		
Chrome Green, Oxide	D263-28		TT-C-231	TT-C-231			31-G-1
Green, pure, dry, paste-in-Japan, paste-in-oil	D212-27		TT-C-236	TT-C-236		TT-C-236	
Green, Routine Analysis	D126-36						
Green, reduced	D213-27	K28-1937					
Yellow, dry, paste-in-Japan, paste-in-oil	D211-27	K27-1937	TT-C-291	TT-C-291		TT-C-291	31-Y-1
Clay, Fire	C105-36		HH-C-451a	HH-C451a		32C6a	24-C-26B
Coke, method of sampling, test	D346-35						
Foundry	D17-16		Q-C-571a	Q-C-571a		Q-C-571a	
(for ingredient primers)				50-11-21	O		
(for firing steam boilers)							16-C-11
Cuprous Oxide	D283-36					52C4b	
Dextrin				4-503-168A	C		
Diacetone Alcohol (for aircraft dope)				4-21	A		
Diatomaceous Earth (granular, calcined)						32E2b	
Dibutylphthalate				50-11-61	O		
Dimethylaniline				50-11-30A	O		
Dinitrophenol				50-11-60	O		
Dinitrotoluene				50-13-10A	O		
Diphenylamine				50-11-27A	O		
Diphenylaminechlorarsine				96-111-16	C		
Drop Black							31-B-1
Ether, petroleum			O-E-751	O-E-751		O-E-751	
(for mfg. smokeless pwdr.)				50-11-45A	O		
Ethyl Acetate	D302-33			4-503-180A	A		
Acetate (synthetic)	D321-33						
Ethylene Glycol Mono Butyl Ether	D330-35						
Glycol Mono Ethyl Ether	D331-35						
Ferrous Sulfide				4-503-190	C		
Gelatine			C-G-191	C-G-191			
Glycerine (glycerol)			O-G-491	O-G-491		51G1d	
(for mfg. nitroglycerin)				50-11-33	O		
Gum Arabic				42.2-24	E		
Ester						52G5	
Tragacanth (for ingredient primers)				50-11-16	O		
Yacca, red						52G9a	
Gypsum, Calcined	C23-30	A49.2-1933	SS-G-901	SS-G-901		SS-G-901	24-G-16 :36T
(testing methods)	C26-33	A49.1-1933					
Hydrogen				4-83	A		
Hydroquinone (paradihydroxybenzene)			O-H-886	O-H-886		O-H-886	
Indian Red, dry	D50-36					52R3C	31-R-1
Iodine and potassium iodide				4-1025B	M		
Iron Oxide (mineral)	D84-27	K25-1937					
Iso-propyl Acetate (85 to 88%)				4-1046	A		
Kaolin, caustic, for gas mask canisters				97-52-35	C		
Kerosene			VV-K-211	VV-K-211		VV-K-211	16-K-1 :36T
Kieselguhr				4-504	C		
Lampblack, dry, paste-in-Japan, paste-in-oil	D209-30	K26-1937	TT-L-71	TT-L-71		TT-L-71	
Lanolin, anhydrous for ammunition				50-11-72	O		
Lead Arsenate, paste							5-I-1 :36T
Arsenate, powdered							5-I-4 :37T
Lime (quicklime), for structural purposes	C6-31		SS-Q-351	SS-Q-351		SS-Q-351	24-L-3 :37T
Hydrated			SS-L-351	4-503-245		SS-L-351	10-L-7 :36T
Quicklime and hydrated lime for mfg. silica brick	C49-24						
Hydrated lime for water treatment	C54-27						

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